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## THE BOTANICAL ORIGIN OF SOME PHARMACOPŒIAL DRUGS.

BY JOHN M. MAISCH.

Read before the Pennsylvania Pharmaceutical Association at York, June 11.

The recent publication of the sixth edition of Gray's Manual of the Botany of the Northern United States, and the fact that this standard work has been thoroughly revised and extended by Professors Sereno Watson and John M. Coulter, naturally lead to a comparison of its authoritative statements with those of the present Pharmacopœia, and invite further inquiries concerning drugs derived from either indigenous or naturalized plants. The following fragmentary notes have thus originated; they cannot lay claim to completeness, but are reported now with the view of inducing others to similar investigations.

*Prickly ash bark* is obtained from two species of *Xanthoxylum*, which are usually distinguished as the Northern and Southern prickly ash. The botanical nomenclature of both species has been rather confused in the past, and it may therefore not be considered out of place to briefly mention the various synonyms which are quoted in full in the excellent "Report on the Forests of North America," by Prof. C. S. Sargent, issued in 1884 as one of the supplemental reports of the tenth census.

*X. americanum*, *Miller*, is the Northern prickly ash, and the following are synonyms for the same plant: *X. Clava-Herculis*, *Lamarck* (not *Linné*); *X. fraxinifolium*, *Marshall*; *X. fraxineum*, *Willdenow*; *X. mite*, *Willdenow*; *X. ramiflorum*, *Michaux*; *X. tricarpum*, *Hooker*, and *Thylax fraxineum*, *Rafinesque*. It is shrubby,

or a small tree not often 7 meters high, with a trunk 0.15 to 0.20 meter in diameter. Its habitat is on rocky hillsides, or more frequently along streams and rich river bottoms, from Massachusetts west to northern Minnesota, eastern Nebraska and eastern Kansas, south to the mountains of Virginia and northern Missouri; its greatest development being reached in the region of the great lakes.

The southern prickly ash is now called *X. Clava-Herculis*, *Linné*. To this name there are the following synonyms (see Sargent, *Forests*, page 30):

*X. fraxinifolium*, *Walter* (not *Marshall*); *Fagara fraxinifolia Lamarck*; *X. carolinianum*, *Lamarck*; *X. aromaticum*, *Willdenow*; *X. tricarpum*, *Michaux*; *Kampmania fraxinifolia*, *Pseudopetalon glandulosum*, *Ps. tricarpum*, and *X. Catesbianum*, the last four names being used by *Rafinesque* in his different writings. The plant is popularly known as toothache tree, prickly ash, tea ash, pepper wood and wild orange. According to Schoepf's *Materia Medica Americana*, page 148, it was known here during the past century as toothache pellitory. Its habitat, varieties, etc., are thus given in the Report on the Forests:

Southern Virginia, southward near the coast to bay Biscayne and Tampa bay, Florida, westward through the Gulf states to Northwestern Louisiana, southern Arkansas (south of the Arkansas river), and the valley of the Brazos river, Texas. A small tree rarely 12 to 14 meters in height, with a trunk 0.30 meter in diameter, of very rapid growth; usually along streams and low rich river bottoms, reaching its greatest development in southern Arkansas, Louisiana and eastern Texas.

A form with trifoliate leaves is *X. macrophyllum*, *Nuttall*, *Sylva* iii, 10.

The variety *fruticosum*, *Gray* (*X. hirsutum*, *Buckley*), is a low shrub or on the Texas coast a small tree 6 to 8 meters in height, with a trunk 0.20 to 0.30 meter in diameter.

*Grisebach* (*Flora*, British West Indian Islands, p. 138) regarded this species as being identical with *X. lanceolatum*, *Poirét*, and *X. caribæum*, *Lamarck*, and states that it is found in Jamaica and all the British West Indian colonies; also in Cuba, Guadeloupe, etc. *De Candolle* (*Prodromus* i, 727) regarded *X. lanceolatum*, *Poirét*, as a species distinct from *X. Clava-Herculis*, *Lin.*, and *X. caribæum*, *Lamarck* (not *Gaertner*), as identical with the latter, the habitat being the forests of the Caribbean Islands.

But *X. caribæum*, *Lamarck*, is now recognized as entirely distinct from the *Hercules* club; it is the *satinwood* of semitropical Florida and the West Indies, and the following synonyms are given by Prof. Sargent: *X. Clava-Herculis*, *Linné*, in part (also *De Candolle*, *Prodromus* and *Grisebach*, *Flora* of the West Indian Islands); *X. lanceolatum*, *Poiret*, and *X. floridanum*, *Nuttall*. According to *Chapman's Flora* of the Southern United States, its branches and petioles are unarmed.

To what extent the barks of these evidently closely related species agree, it is impossible to say in the absence of well authenticated specimens. But it should be stated that for some years past the southern prickly ash of our market has to some extent differed in macroscopic appearance from that formerly seen, the chief difference being the reduced number or almost total absence of the stout spines with which the branches of our southern plant are armed, they being replaced by numerous large conical corky excrescences. Since the anatomical structure does not differ materially from that of the bark formerly met with, it is not unlikely that the present bark may be derived exclusively from the trunk and older branches. I hope to soon procure authentic botanical specimens, when this question may be definitely settled. If the opinion expressed here be the correct explanation, it would appear that the present gatherers of southern prickly ash bark were not as considerate as those of thirty or forty years ago when the bark of the branches was exclusively or chiefly collected; such a course did not destroy the tree, which must necessarily be the case if the trunk itself be stripped of its bark.

But another interesting question arises in connection with the nomenclature adopted by the new edition of the Manual, and in view of the results obtained by chemical analysis. The southern prickly ash bark was chemically investigated by *Geo. H. Colton* (*AMER. JOUR. PHAR.*, 1880, p. 191), *E. T. Moffitt* (*ibid.*, 1886, p. 417) and *E. G. Eberhardt* (*ibid.*, 1890, p. 231), who established the presence of an alkaloid, which, however, does not show any similarity with berberine. This latter alkaloid was isolated by *J. D. Perrins* nearly thirty years ago (*ibid.*, 1863, p. 459) from the bark of the Caribbean *X. Clava-Herculis*, *Lin*, and had been described by *Chevallier* and *Pelletan* as early as 1826 under the name of *Xanthopicrite*. Mr. Perrins' bark was furnished by *Daniel Hanbury*, and

agreed with Martiny's description in being of a "highly laminated texture, splitting readily into thin plates like garden bast;" Perrins adds that this bark must not be confounded with that of *X. Clava-Herculis*, *Lamarck*, the latter species being totally distinct; as above shown it is our Northern prickly ash.

The distinction in these physical characters was pointed out by Bridges (Proceedings, Am. Phar. Assoc., 1864, p. 272), when he established the source of our Southern prickly ash bark from specimens collected by Mr. Wm. Heyser, of Chambersburg, Pa. Dr. Bridges also quoted from Spach's *Histoire Naturelle* a distinctive characteristic to be found in the spines which in the Caribbean species are "short, in pairs, and dilated at the base," while those of our southern species are "very pointed, and strongly dilated at the base, sometimes attaining an inch in diameter."

A fuller description of the West Indian *xanthoxylum* bark is given by Guibourt (*Histoire Naturelle des drogues simples*, iii, 513) who states that "the bark of the *clavalier jaune* (yellow Hercules club) or *épineux jaune des Antilles* (yellow-thorn) has some resemblance to the true *augustura* bark, is thin, has a similar odor, and a bitter very disagreeable taste, leaving upon the tongue an impression of acidity and producing salivation; it is, however, easily distinguished by its canary-yellow color, by its imparting a yellow color to the saliva, and by the fibrous layers of the interior portion preventing a smooth fracture." By the characters named this bark is readily distinguished from our Southern prickly ash. Its origin was first suggested by Virey in 1820 (*Four. de Phar.*, vi, 88), who described it under the name of *cascanogui*.

According to Grisebach (*loc cit.*) the species in question is known in the British West Indies as *prickly yellow wood*, and different species of *Xanthoxylum* and *Tobinia* (the latter now united with the former genus by Bentham and Hooker) are designated as *yellow wood*; also as *fustic* which name is, perhaps, more frequently given to the osage orange, *Maclura aurantiaca*, *Nuttall* (ord. *Urticacæ*), and in Kentucky to *Cladrastis tinctoria*, *Rafinesque* (ord. *Leguminosæ*).

It follows from the above investigations that the West Indian Hercules club differs from our Southern prickly ash botanically as well, as also chemically, even if its acrid principle should ultimately be found to be identical with that of our southern indigenous



species. In this connection it may be of interest to note the medicinal properties of this bark, which according to Lindley (*Flora medica*) is much used in the West Indies in malignant ulcers, both internally and externally; an infusion is reckoned antispasmodic; tincture found by Dr. Gillespie, a West Indian practitioner, to be a good febrifuge; according to others the decoction is anti-syphilitic.

As at present constituted by Bentham and Hooker, the genus *Xanthoxylum* comprises about 110 species which are mostly found in tropical regions, four being indigenous to the United States, but only two confined to this territory. These two species are now recognized by the Pharmacopœia as *X. fraxineum* and *X. carolinianum*—names which appear to the writer to be more descriptive, and therefore preferable to the older names *X. americanum* and *X. Clava-Herculis*, of which particularly the latter has been the cause of much confusion.

*Cytisus scoparius*, Link, broom, is a shrub introduced from Europe, and in the new "Gray's Manual" is stated to grow in Virginia and southward. It is, however, completely established in and near Philadelphia, along the Philadelphia, Wilmington and Baltimore Railroad, where it grows quite profusely in some localities in sandy soil and sunny locations. The shrub deserves to receive some attention, as during its flowering period in May and June it has quite an attractive appearance owing to the numerous bright yellow flowers, which afford a pleasant relief to barren, and frequently bare hillsides. The young branches have been admitted into the United States and British Pharmacopœias, though they are no longer thus distinguished by the Pharmacopœias of Continental Europe; they are, however, still popularly used there for their diuretic and purgative properties; and the flower buds have been used sometimes as a substitute for capers, and the roasted seeds in the place of coffee. The plant was placed by Linnæus in the genus *Spartium*; French and German botanists usually follow either Lamarck, who placed it in the genus *Genista*, or Koch (*Sarothamnus*), or Link (*Cytisus*). Bentham and Hooker have grouped about 40 species in the genus *Cytisus*, the plant in question belonging to the first section *Sarothamnus*.

*Senega*.—During the past year (AMER. JOUR. PHAR., Sept. 1889, p. 449-453) I have shown that the keelless or false senega root, which has been in the market during the past fourteen years,

is produced by *Polygala alba*, *Nuttall*. Since the present edition of Gray's Manual includes also the plants west of the Mississippi to Western Kansas, it gives a description of this plant as well as of the true senega plant, and it will, therefore, be of special interest to compare the botanical characteristics of the two, which are given as follows:

*P. Senega, Linné.*

Stems several from thick and hard knotty rootstocks, simple (6 to 12 in. high);

Leaves lanceolate or oblong-lanceolate, with rough margins;

Wings (i. e., 2 inner sepals) round-ovate, concave;

Crest (of lower petal) short;

Caruncle (of seed) nearly as long as the seed.

*Habitat.* Rocky soil, W. New England to Minn., and southward.

*P. Alba, Nuttall.*

Stems several from a hard rootstock 1 foot high;

Leaves narrowly linear, 3-12 lines long, acute;

Wings oblong-ovate;

Crest small;

Lobes of the caruncle half the length of the appressed-silky seed.

Nebraska and Kansas to Texas.

From the descriptions it will be observed that the close resemblance is not confined to the roots, but applies also to the over-ground organs of the plant.

*Fennel* "has become naturalized along the shores of Maryland and Virginia, and is a common escape." The name preferred for the plant is *Feniculum officinale*, *Allioni*, while the present Pharmacopœia has *F. vulgare*, *Gaertner*.

*Caraway*, *Carum Carui*, *Linné*, is stated to be "naturalized in many places, especially northward."

*Conium maculatum*, *Linné*, appears to have spread considerably on this continent. Of late years I have received specimens of the plant from several localities in Pennsylvania and neighboring states, where it did not exist about twenty years ago. The present "Manual" states that the plant grows in waste places from New England to Pennsylvania, and west to Iowa and Minnesota.

*Burdock* is enumerated under the Linnæan name *Arctium Lappa*, replacing *Lappa officinalis*, *Allioni*, of the Pharmacopœia.

*Dandelion* is now *Taraxacum officinale*, *Weber*, in the place of *T. Dens-leonis*, *Desfontaines*, as at present recognized by the Pharmacopœia.

*Lactucarium* is not likely to be prepared in the United States on a large scale, as long as a sufficient supply is furnished from Europe at a moderate price. But it is of interest to note that one of the plants yielding it has considerably increased the number of its habitations on this continent; for, according to the "Manual," *Lactuca Scariola*, *Linné* extends in waste grounds and on roadsides, from the Atlantic States to Missouri and Minnesota. Since, a good medicinal lactucarium may also be prepared from our indigenous species, it should be noted that the plants regarded as mere varieties in the preceding edition of the Manual have been restored to the dignity of species; accordingly we have now *L. canadensis*, *Linné*, *L. integrifolia*, *Bigelow*, and *L. hirsuta*, *Muhlenberg*.

*Sweet Fern* is no longer *Comptonia asplenifolia*, *Aiton*, the genus having been united as a section or subgenus with *Myrica*; hence we have now *Myrica asplenifolia*, *Endlicher*.

*Chestnut leaves* are henceforth collected from *Castanea sativa*, *Miller*, var. *americana*, instead of from *C. vesca* *L.* The latter name appears to be more appropriate for our indigenous tree, which is rarely cultivated.

## MARRUBIUM VULGARE.

BY JOHN W. MORRISON, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—  
No. 75.

In order to determine the usual constituents of this plant, a portion was first subjected to a systematic course of proximate analysis, by the usual solvents, with the following result:

	Per Cent.
Fat, wax and traces of volatile oil, . . . . .	2.05
Crystalline compound, soluble in ether, . . . . .	.48
Chlorophyl and fat, . . . . .	2.29
Resin and bitter compounds, soluble in absolute alcohol, . . . .	1.94
Mucilage, . . . . .	4.94
Glucose, . . . . .	.67
Extractive, soluble in water, . . . . .	5.93
Albuminoids, . . . . .	4.48
Pectin and undetermined, . . . . .	5.93
Pararabin, . . . . .	2.30
Cellulose and Lignin, . . . . .	37.48
Moisture, . . . . .	6.72
Ash, . . . . .	24.30
Loss, . . . . .	.49
	<hr/> 100.00

The fat was soluble in hot 95 per cent. alcohol, and melted at  $46^{\circ}$  C. The wax was insoluble in this solvent, but dissolved in carbon bisulphide. The crystalline principle was extracted from the drug with stronger ether, and purified by repeated crystallization from hot 95 per cent. alcohol, with one or more treatments with animal charcoal. The crystals were insoluble in water and in solution of potassium hydrate, very sparingly soluble in boiling water and in cold alcohol. Soluble in hot 95 per cent. alcohol, also in ether and chloroform. They melted at  $152^{\circ}$  to  $153^{\circ}$  C. They were at first tasteless, but developed, when held on the tongue, a decided bitterness. The alcoholic solution was very bitter.

Sulphuric or nitric acid gave a dark brown color, hydrochloric acid produced no change and ferric chloride produced no change.

This principle reduced Fehling's solution by a boiling water-bath, without first treating with an acid. On boiling it first with acidulated water a peculiar aromatic odor was developed, then on heating with Fehling's solution an abundant precipitate of cuprous oxide was produced, thus showing it to be an easily decomposed glucoside.

A small quantity of a bitter principle was extracted from the drug by absolute alcohol, along with the resin. This appeared to be different from the previous one extracted by ether, and for the purpose of further investigation, a larger quantity of the drug was exhausted with ether, the solvent recovered and the residue treated with petroleum ether to remove fat and wax. The remaining portion was dissolved in hot alcohol, treated with animal charcoal and crystallized. The crystals were purified by repeated crystallization and treatment with animal charcoal. Melting point,  $152^{\circ}$  to  $153^{\circ}$  C.

The average of two combustion was :

	Found.	Calculated for. ( $C_{10}H_{12}O_9$ .)
C, . . . . .	70.25	70.38
H, . . . . .	8.42	8.50
O, . . . . .	21.33	21.12
	<hr/> 100.00	<hr/> 100.00

Three samples of crystals, presented with a thesis of last year by Frederick G. Hertel, Ph.G. (*AMERICAN JOURNAL OF PHARMACY*, 1890, p. 273) and obtained by him from the fluid extract, were also examined. One of these, which he had crystallized from cold alcohol,

melted at  $153.5^{\circ}$  to  $154.5^{\circ}$  C. was evidently nearly pure, the average of three combustions gave :

C, . . . . .	70.54
H, . . . . .	9.08
O, . . . . .	20.38
	<hr/>
	100.00

The other samples were evidently the same compound in a more impure condition, as was found by combustion and melting point.

This compound as well as that obtained by myself is evidently the marrubiin discovered by Mein in 1855. Harm (Archiv der Pharmacie, No. 83, page 144) stated the melting point to be  $148^{\circ}$  C.

In a later communication the same author (No. 116, page 41) on elementary analysis found the substance contained 8.52 per cent. of hydrogen and "more than 69 per cent. of carbon."

Kromayer (Archiv der Pharmacie, No. 108, page 257) gives the yield of marrubiin as about 2 grams from 25 pounds of the drug, and states the melting point to be about  $160^{\circ}$  C., and that it is not a glucoside. My results indicate its composition to be very close to that of absinthiin  $C_{40}H_{58}O_9$ , but it does not agree with all the properties of that substance described by Kromayer in the same journal (No. 108, p. 120), who states that absinthiin melts at  $120^{\circ}$  to  $125^{\circ}$  C. Many of the properties, however, are common to both substances, prominent among which are, solubility, taste, gritty between the teeth, crystalline appearance and percentage composition.

The larger portion of the drug, after exhaustion with ether, was extracted with methyl alcohol, the solvent recovered and the residue treated with water and filtered.

The filtrate, on agitation, successively with ether and chloroform, yielded to the former a very bitter greenish substance with a narcotic odor, and to the latter, a brownish substance with a bitter and pungent taste. Both gave negative results when tested for alkaloids and both reduced Fehling's solution, especially after heating with dilute acid, during which process each developed a peculiar aromatic odor. These results point to the presence of two bitter principles besides marrubiin, which is in agreement with Hertel's statement that after the separation of marrubiin "the fluid extract appeared to be as bitter as before."



## NOTES ON SOME NORTH AMERICAN MEDICINAL PLANTS.

BY JOHN M. MAISCH.

Read before the Pennsylvania Pharmaceutical Association, at York, June 11.

*Adulterated Staranise.*—The *Répertoire de Pharmacie*, of April 10, contains the following statements:

"Mr. E. Barral announces in *Gazette hebdomadaire*, of November 29, 1889, a new dangerous falsification of staranise with the fruit of *Illicium parviflorum*; these fruits, he states, resemble those of the true staranise, and for several years have been met with in England and Germany. Mr. Barral has studied the effects of the decoction and of the extract of this fruit, and has proved that these preparations contain a toxic principle which produces in dogs vomiting, insensibility, paralysis of the posterior limbs, convulsions, and finally death. The poisonous principle resides principally in the seed, and is probably a glucoside differing from that met with in *I. religiosum*."

The plant mentioned is a shrub indigenous to the southern districts of Georgia and to East Florida, and to some extent cultivated in Europe in botanical gardens. It is scarcely likely that the fruit be collected in Europe for the purpose of mixing it with staranise; and inquiries made by me in this country have thus far failed to find the fruit in commerce. Mr. E. M. Holmes called attention to this fruit in *Phar. Jour. and Trans.*, December 18, 1880 (see *AM. JOUR. PHAR.*, 1881, p. 335), described it as consisting of eight short-beaked capsules having a sassafras-like taste, and stated that it and the fruit of *Ill. floridanum* are not met with in commerce.

The two indigenous species have been looked upon with suspicion in their native localities, and the last named, which is found from Florida west to Louisiana and Mississippi is known sometimes as "poison bay." This species was histologically and chemically investigated by Henry C. C. Maisch (*AM. JOUR. PHAR.*, 1885, pp. 225 and 278), who isolated from the leaves and the capsules crystals of a glucoside which probably represents the poisonous principle, and differs from the shikimin isolated by Eykman from the capsules of *Ill. religiosum*. The different parts of *I. parviflorum*, to which attention has again been drawn by Barral's communication, deserve to be fully investigated.

*Hedeoma* is the name of a genus of labiate plants, comprising about fourteen species indigenous to North and South America.

The best known and most widely distributed species is *H. pulegioides*, which extends from New England to Dakota and southward, being met with in the southern states on dry hills. From the resemblance of its odor and taste to the European *Mentha Pulegium*, *Linné*, it is known throughout the country as *pennyroyal* or *American pennyroyal*. Most, if not all, the other species of *Hedeoma* have a different odor. *H. piperita*, *Benthams*, for instance, is peppermint-like, and according to the Mexican Pharmacopœia, is used like and in place of peppermint. Some of the North American species may, perhaps, be locally employed. This is the case with *H. thymoides*, *Gray*, which grows in Texas on high land and produces its pink and fragrant flowers in April. In Lavaca County, and possibly in other parts of Texas, the plant has the reputation of being diaphoretic and febrifuge, the infusion being employed. The taste of the plant is aromatic, citronella-like, and scarcely bitterish.

*Colorado Cough root.*—Under this name a root has been received on several occasions, which is said to be commonly used in some parts of Colorado. It is evidently derived from an umbelliferous plant, and having a lovage-like flavor, may possibly be the root of a *Ligusticum*, of which four species are known to be indigenous to the state named (*Coulter, Rocky Mountain Botany*, p. 117). But since a large number of species of other umbelliferous genera are likewise peculiar to this region, it is impossible to arrive at a reliable conclusion without botanical specimens. Such were promised, but have not yet been received. The root is masticated, and is also employed in the form of powder as a snuff said to be efficient in catarrh and neuralgic affections.

*Peppertree* is the popular name of an ornamental tree which is not indigenous to North America, but is cultivated to some extent in California. The leaves as well as the reddish drupaceous fruits, which are of the size of black pepper, have a strong peppery flavor; hence the popular name. The tree belongs to the order of *Anacardiaceæ*, and to a genus of about thirteen species, mostly of tropical America. *Schinus Molle*, *Linné*, grows from Mexico southward, and in the country named is known as *arbol del Peru*, indicating its South American origin. The bark, leaves, fruit, and the gum-resinous exudation are employed medicinally, the former as a balsamic astringent, the other products for their stimulating properties (see *AMER. JOUR. PHAR.*, 1866, p. 503, and 1885, p. 340). When

the piperaceous taste is considered, and the fact that the fruit contains enough sugar to warrant its employment for the preparation of an alcoholic beverage and of vinegar, it is surprising that the different parts of the plant have not been subjected to analysis. The bark contains tannin; the gum resin contains about 60 per cent. of resin and a little volatile oil, and the fruit was supposed by Landerer (1862) to contain piperine, which supposition, however, does not appear to have been verified or disproved by later investigations.

## MICROSCOPICAL EXAMINATION OF POWDERS.

BY HANS M. WILDER.

### II.

*Reflected Light.*—Although the examination of a powder is chiefly conducted by transmitted light, many valuable hints may be obtained by first examining the powder by reflected light; of course, with the dry powder against a dark background, and then when mixed with water (or other fluid) under a cover glass, similarly.

*Specific Gravity.*—It will in many cases (especially with compound powders) be of great help to be able to examine the several constituents of a powder separately, at any rate some of them. This can be attained by an elutriation process ("water sifting" as Remington happily calls it). Fill a conical glass (graduate) three-fourths full of water, sprinkle on top of the water some of the powder to be examined, and allow the particles to settle undisturbed; the heaviest sink, of course, first. After a short time examine the particles floating on top, and those on the bottom separately. Several powders are a good deal heavier than water, when a strong solution of salt, or a heavier liquid should be used.

*Sections.*—A preliminary study of sections of the drug in question is of great assistance in recognizing the powder. Transverse sections are not of so much use as longitudinal ones (both radial and tangential) because the elements of the powder seldom will be seen "standing on end," as it were; they are chiefly seen from the flat side (surface view).

*Heating.*—A great help in clearing a mount, is to heat the slide until numerous small air-bubbles appear—until the medium just begins to boil, but not longer.

*Mounting.*—A mistake, beginners are very apt to make, is to put

sufficient powder on one slide to make six or more useful slides. The thinner the layer of powder, and, one might say, the less of it there is, the easier the mount can be examined.

*Hard Oil Finish.*—The writer would recommend a trial of hard oil finish (Berry Bros. "white") as a substitute for the smeary, sticky benzol balsam, it being much more agreeable to handle, and drying in a much shorter time. Its drawbacks are that it imparts a decidedly yellowish cast to the mount, and that the mounts are not so glassy-like as the pure balsam mounts.

*Adulterations.*—It is advisable to become familiar with the microscopical appearance (both dry, and in different media) of the following substances, which are most commonly met with as impurities and adulterations: Fibres, starches, wheat, rye, corn, rice and oat flour, ground cocoanut shells (not cacao), cedarwood ("segar-box wood"), mineral colors (chrome yellow, Venetian red, Spanish brown, oxide of iron), sand, charcoal, dried bread ("cracker dust").

## OBSERVATIONS ON SOME FLUID EXTRACTS.

### ABSTRACTS FROM THESES.

*Extractum Buchu Fluidum.*—Edward Moor, Jr., Ph.G., made a series of experiments with the view of determining the amount of soluble matter taken up from short buchu leaves, in No. 60 powder in different portions of percolate. 1,000 grams of the powder were used for each experiment. In Nos. 2 and 6 the ordinary percolator of rather large diameter was employed, while for the remaining four the narrow Oldberg's percolator was taken. The menstruum was that directed by the Pharmacopœia. In the two experiments made by the pharmacopœial process the first portion reserved measured 850 cc., and the weaker percolates were collected in fractions of 1,000 cc. Commencing in experiment No. 3 with repercolation, the first portion reserved measured 750 cc., and the weaker portions were again collected in fractions of 1,000 cc. For the remaining three percolations the weaker percolates of the preceding experiment were employed in the place of alcohol and water, and each of the five portions of percolate measured 1,000 cc. The first portions of the repercolation experiments correspond to the finished fluid extract. The amount of extractive matter taken up was determined by evaporating, in a water bath, 100 cc. of each fraction to nearly a pilular consistence. The finished fluid extract made by process

No. 1 was kept on hand for six months, when it had deposited a slight precipitate which, after being collected on a weighed filter, was found to amount to 1.25 gm. The results tabulated are as follows:

Percolates.	U. S. P. PROCESS.		REPERCOLATION.			
	No. 1. Per Cent.	No. 2. Per Cent.	No. 3. Per Cent.	No. 4. Per Cent.	No. 5. Per Cent.	No. 6. Per Cent.
First portion, . . . . .	20.75	18.10	21.40	22.80	22.20	18.60
Second portion, . . . . .	5.50	6.25	6.30	5.90	5.70	6.05
Third portion, . . . . .	1.95	2.60	2.10	2.15	2.15	2.20
Fourth portion, . . . . .	.95	1.15	.85	1.30	1.20	1.25
Fifth portion, . . . . .	.35	.65	.45	.50	.45	.70
Total extractive, . . . . .	29.50	28.75	31.10	32.75	31.70	28.80

*Extractum Grindeliæ Fluidum.*—Aiming at preparing this fluid extract so as to mix with water without precipitating, W. H. Kunkle, Ph.G, used first the pharmacopœial menstruum, alcohol 3 p., water 1 p.; secondly, diluted alcohol, and thirdly, diluted alcohol rendered alkaline by 5 gm. soda solution for 100 gm. of powdered grindelia. These preparations were precipitated by water. But the fluid extract remained clear on dilution, when prepared by exhausting the powder with water containing, for 100 gm. of powder, 2 gm. of borax; reserving the first 60 cc. of the percolate; evaporating the remainder to a soft extract; dissolving this in the reserved liquid; adding water to make 75 cc., and then mixing with 25 cc. of alcohol. A precipitate is produced which appears to consist mainly of borax and gummy matter, and after filtering, a handsome preparation was yielded which was miscible with water in all proportions without causing a precipitate. No observations are recorded as to the medicinal effects of this borated fluid extract; but reference is made to the suggestion of Dr. W. P. Gibbons who, for obtaining the therapeutic effects of grindelia, found the borated infusion more reliable than an alcoholic preparation.

*Extractum Humuli Fluidum.*—Peter N. Duff, Ph.G., prepared four fluid extracts, using in each case 16 oz of hops grown in New York State in 1889. The menstruums were 1, alcohol 8 p., water 1 p.; 2, alcohol 3 p., water 1 p.; 3, alcohol 2 p., water 1 p., and 4, diluted alcohol. The hop was used in No. 20 powder, and the fluid extracts prepared by percolation in the usual manner. On keeping the preparations for some time at a temperature of 50° to 60° F., No. 1



remained free from deposit; it has a dark reddish color and the full rich aroma of the hops. No. 2 showed a heavy deposit of extractive matter, while the deposits in Nos. 3 and 4 were less pronounced; but these three preparations seemed also to possess the full aroma of the hops.

*Extractum Cubebe Fluidum.*—F. M. Schick, Ph.G., determined the amount of residue left from this fluid extract by evaporating one ounce of it in a tared capsule placed in a water-bath on a steam radiator. Two extracts prepared by himself left respectively 26 and 26.25 per cent., while fourteen samples procured in different cities gave the following yields: 16.67, 18.33, 20, 21.67, 23.33, 24, 24.16, 24.58, 25.21, 26.50, 27.33, 30.83, 31.25 and 31.67 per cent.

## ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

**GRANULAR DRUGS**—M. P. Carles (*Repert. de Phar.*, May), says that these have a finer appearance than ordinary powdered drugs, and that they are easier to handle; and give clearer preparations when used for macerations or infusions. But he has found by chemical analysis that the granulated drugs are not so rich in alkaloids as are the ordinary powdered drugs, and that their lack of strength is, with a few exceptions, proportioned to the size of the granulated particles. His conclusions are presented as follows: "When, by means of a progressive division and the use of sieves we convert simple drugs into granular powders we disturb their pharmacodynamic harmony and modify their richness in extractive matters; and we do this always in the same way; that is, to the prejudice of the coarser powders and to the advantage of those which are the most finely divided."

**CHLORAL-ANTIPYRINE.**—At a recent meeting of the *Société de Pharmacie*, M. Béhal showed samples of monochloral-antipyrine and bichloral-antipyrine. The first was displayed in the form of large crystals in the Exposition of 1889. It seems probable that, under these names, the above preparations are to receive careful clinical tests from French physicians.

**PHYSIOLOGICAL ACTION OF FERROCYANIDE OF POTASSIUM.**—MM. Combemale and Dubiquet have reported to the *Société de Biologie* the results of their experiments with this drug on dogs and guinea pigs. They found that in doses of 2 gm. per kilogramme of the

animal, the ferrocyanide of potassium had no toxic effect, and no influence upon respiration, circulation, temperature, or the nervous system. In dogs the continued use of the drug caused intestinal disturbances. In doses of 80 cgm. per kilogramme it gave rise to vomiting. Light doses caused diuresis in the smaller animals.

**TANNICATED SYRUP OF IODINE.**—For this, *L'Officine* gives the formula of: Iodine, 2 gm.; ext. krameria, 8 gm.; simple syrup, q. s. to make 1 kilogramme. M. Demandre (*Bull. de la Soc. des Phar. de la Côte d'Or*), proposes a shorter method than that of the Codex, and one in which the iodine "enters into integral combination with the tannin without loss." He dissolves iodine, 2 gm., in alcohol, 24 gm., and mixes this tincture with a solution of ext. krameria, 8 gm., in chemically pure glycerin, 16 gm., adding, finally, 950 gm. of simple syrup. This he heats slowly in a water-bath for two hours to a temperature of 149° to 158° F. "The syrup thus obtained," says the author, "may be diluted with pure water, or with starch-water, without giving any reaction; it has a fine red color, is limpid and keeps well." *Répert. de Phar.*, June 10.

**DISTILLED WATER IN METALLIC CONTAINERS.**—M. Kauffeisen, of Dijon, made a preparation of orange-flower water, 50 gm.; syrup of codeine, 15 gm.; and tr. digitalis, 10 drops. On the next day he found the mixture almost as dark as though it had consisted chiefly of digitalis. He found that the distilled water used by him had been brought to the pharmacy in an iron vessel. The water had not remained long in the receptacle but the pharmacist found it to contain nearly 1 cgm. of iron to the litre. When the water is known to contain iron, the author thinks this may be removed by stirring in a small quantity of carbonate of magnesia and filtering.—*Bull. de la Soc. des Phar. de la Côte d'Or*.

**REACTION OF SALIVA UPON CALOMEL IN IODOFORM POISONING.**—M. Burlureaux observed a scarlatinaform eruption in a patient whose arm had been treated topically with iodoform. The patient was asked to take a piece of silver into his mouth, and soon perceived the alliaceous taste characteristic in such cases. A small quantity of the patient's saliva was then treated with calomel. It gave the greenish-yellow reaction of protiodide of mercury.

**CALOMEL PLASTER**—As used by Dr. Quinquaud in the treatment of syphilis, this consists of: Calomel, 10 parts; diachylon plaster, 30 parts; castor oil, 3 parts. The ointment is spread upon muslin cut

into pieces four inches square. These are applied over the splenic region for eight days at a time, allowing intervals of eight days between the applications. The plasters should be renewed every four days. The author says: "With a plaster of this size there is usually no salivation; with one of double the size we get a slight salivation with a benign stomatitis." It is stated that the author administers mercury for syphilis in no other form.—*Soc. Franc. de Derm. et de Syph.*, Apr. 12.

THE TOXALBUMINS.—According to Professor Cornil the toxic action of pathogenetic microbes is not wholly due either to the microbes themselves or the alkaloids they secrete. Christmas has found that cultures of staphylococcus pyogenes aureus contain a pyogenic albuminous substance which may be precipitated by alcohol. Hankin precipitated this toxic albumin from cultures of charbon bacilli by the use of ammonia sulphate and alcohol, and found them to possess innoculatory power. Brieger and Fränkel and Roux and Yersin obtained the substance from cultures of the diphtheritic bacillus. It is soluble in water and may be precipitated by carbonic, acetic and some of the concentrated mineral acids, by phenol, sulphate of copper, nitrate of silver, chloride of mercury, the usual reagents for albumin, and the xanthoproteic reagent, while polarization also shows that it is a derivative of albumin. The substance is said to resemble sero-albumin. It is very toxic and conserves its properties after being subjected to a heat of 158° F. Brieger and Fränkel think that the toxalbumins "arise in the organism and develop there at the expense of the albumin of the tissues.—*Four. de conn. méd.*, May 1.

DENTIFRICES.—The formulæ of M. P. Vigier's antiseptic dentifrices are given in the *Gazette hebdomadaire* as follows: POWDER—Resorcin, 2 gm.; salol, 4 gm.; iris (pulv.), 40 gm.; carbonate of lime, 8 gm.; carmine No. 40, 30 cmg. Ten drops of ol. menth. pip. may be added if thought necessary, but the author considers the odor of the salol as quite sufficient. ELIXIR—Any elixir dentifrice, 100 gm.; resorcin, 2 gm.; salol, 2 gm.

MILK OF LIME AS A DISINFECTANT FOR WALLS EXPOSED TO THE GERMS OF DISEASE.—Experiments made by Dr. Giaxa, of the University of Pisa, seem to show that the bacilli of typhoid fever and of cholera are destroyed by this application, which, for the former should contain 50, and for the latter, 20 per cent. of lime.

Milk of lime will also destroy the bacillus of charbon, but not its spores. The bacillus of tetanus and of tuberculosis are not affected by lime, and, in these cases, corrosive sublimate should be used. To destroy the staphylococcus pyogenes aureus, a prolonged action of the lime preparation is necessary; 50 per cent. applications should be made upon the walls four times in quick succession in order to insure a complete destruction of the germs.—*Ann. de microg. ; Répert. de Phar.*, May.

### CHEMICAL NOTES.

BY HENRY C. C. MAISCH, Ph.G., Ph.D.

*On Panax Ginseng*.—Davydow (*Pharm. Zeitschr. f. Russl.*, 1890, p. 97, 113, 130) has taken up the analysis of this root made by Garrigues (*AM. JOUR. PHARM.*, 1854, p. 511). For panaquilon he uses the following process: The finely powdered root is repeatedly extracted with cold water until the same shows no acid reaction. The several aqueous extracts were united and treated with animal charcoal, filtered and evaporated to dryness. The residue is dissolved in boiling 95 per cent. alcohol, filtered, and the alcohol recovered. Panaquilon remains as an amorphous, light yellow mass, easily soluble in alcohol and water, insoluble in ether, and does not contain nitrogen. Concentrated sulphuric acid gives a blood-red color, gradually turning to a reddish violet. Panaquilon is neither an alkaloid nor a glucoside. On boiling with dilute sulphuric acid a crystalline powder, panacon, separates, which is insoluble in water and ether, but soluble in alcohol. Concentrated sulphuric acid dissolves and colors it purplish red. Concentrated nitric acid oxidizes it to oxalic acid. Garrigues gives the following formulæ: Panaquilon  $C_{24}H_{25}O_{18}$ , panacon  $C_{22}H_{19}O_8$  ( $O=8$ ).

*Chemical Constituents of Quassia amara, L., and Picræna excelsa, Lindl.*—F. Massute (*Lieb. Ann.*, ccxxviii, 147–141) isolated the bitter principles quassiin and picrasmin, and found that they are mixtures, the constituents being separated by fractional crystallization. Quassiin contains the following:  $C_{32}H_{40}O_{10}$  (Wiggers) ( $C_{32}H_{41}O_{10}$  Oliveri and Denaro) melting at  $210^{\circ}$ – $211^{\circ}$  C.  $C_{32}H_{40}O_{10}$  ( $CH_2$ )<sub>3</sub>, m. p.  $215^{\circ}$ – $217^{\circ}$  C.;  $C_{32}H_{40}O_{10}$  ( $CH_2$ )<sub>5</sub>, m. p.  $221^{\circ}$ – $226^{\circ}$ , and a new body, not analyzed m. p.  $239^{\circ}$ – $242^{\circ}$  C. By heating quassiin with hydrochloric acid, Oliveri and Denaro obtained quassiinic acid,

which has the composition  $C_{30} H_{38} O_{10}$ . Picrasmin contains  $C_{29} H_{34} O_{10}$  m. p.  $212^{\circ}$ – $216^{\circ}$  C.;  $C_{29} H_{34} O_{10} (C H_2)_6$  m. p.  $204$ – $205$ ,  $C_{29} H_{34} O_{10} (C H_2)_7$  m. p.  $209^{\circ}$ – $212^{\circ}$  C., and two bodies melting at  $231$ – $234$  and  $239$ – $247^{\circ}$  C. respectively. Picrasmin m. p.  $204^{\circ}$ – $205^{\circ}$  treated, like quassiin yields picrasmic acid  $C_{33} H_{42} O_{14} + 5 H_2O$ . Distillation with soda-lime yields fluorescent hydrocarbons very likely of the anthracene group. From this it is evident that the two bitter principles are not identical as has been supposed. Besides these bitter principles both woods seem to contain also small quantities of an alkaloid. A body from *Q. amara*, which dissolves in acidulated alcohol with an ultramarine blue fluorescence and crystallizes in yellowish prisms, seems to be an alkaloid.

*Ephedrine and Isoephedrine*.—Dr. N. Nagai (*Tokio Chem. Society*, through *Chem. Zeit.*, 1890, p. 441) obtained the alkaloid ephedrine from the stem of *Ephedra vulgaris* (ma-oh). The composition is  $C_{10} H_{15} NO$ ; by oxidation the alkaloid is split into benzoic acid, monomethylamine and oxalic acid. Isoephedrine m. p.  $114^{\circ}$  C., is obtained by heating ephedrine m. p.  $30^{\circ}$  C., with hydrochloric acid in a closed tube to  $180^{\circ}$  C. The constitution of ephedrine is  $C_6 H_5 CH_2 CH (N H C H_3) CH_2 OH$ , and that of isoephedrine is  $C_6 H_5 CH_2 C (OH) (N H CH_3) C H_3$ .

*On Lobeline*.—H. Paschkis and A. Smita (*Akademie d. Wissen., Wien*, April 17, 1890, through *Chem. Zeit.*, 1890, 594) use the following method for preparing lobeline: The herb of *Lobelia inflata* is extracted with water acidified with acetic acid, the extract partly evaporated, made alkaline and extracted with ether. An extract was taken up with water and being acid was made alkaline and shaken with ether. The ether was evaporated and the alkaloid obtained as a thick oil of a yellow color. For purifying, the alkaloid was dissolved in ether, shaken with water acidulated with hydrochloric acid, then made alkaline and taken up with ether. This was repeated three times, the ethereal solution then dried with potassium hydrate, and the ether distilled in an atmosphere of hydrogen. The free alkaloid or the sulphate was suspended in 10 per cent. potassium hydrate solution and treated with 4 per cent. potassium permanganate, until the green color disappeared only slowly. The mixture was then filtered, acidified with sulphuric acid, extracted with ether, this evaporated and residue recrystallized from water. This proved to be benzoic acid.



*On Damascenine, an Alkaloid from Nigella damascena L.* Dr. A. Schneider (*Pharm. Centralh.*, 1890, p. 174 and 191) has isolated the fluorescent principle from the seeds of the above plant and shows it to be an alkaloid present to the amount of 0.1 per cent, and localized in the testa. The crushed seeds were macerated with benzin and expressed, this being repeated a number of times. This solution was then treated three times with dilute hydrochloric acid (1 pt. HCl Ph. Germ., 3 pts. H<sub>2</sub>O) filtered and made alkaline with sodium carbonate solution. In the first portion this caused a precipitate, the remaining portions as well as the filtrate from the first were extracted with chloroform. This solution was extracted with acid of the above strength and the alkaloid precipitated with solution of sodium carbonate. The precipitate which, however, was not solid but consisted of small oily drops was dissolved in absolute alcohol, and this solvent evaporated over sulphuric acid in a vacuum desiccator. The oil obtained was crystallized in a freezing mixture, and the cold solid pressed between bibulous paper. Thus prepared, the alkaloid melts at 27° C., and boils at 168° C., although it is volatile at ordinary temperature. The sp. gr. of the melted damascenine is 1.01. The alkaloid is insoluble in cold water and slightly so in hot, easily in ethyl and methyl alcohols, chloroform, methiodide, carbon bisulphide, benzin, petroleum ether, benzol, fatty oils and paraffine. All solutions of the free alkaloid show blue fluorescence. Precipitates, consisting of minute oily drops, are formed with ammonia, sodium hydrate and carbonate, corrosive sublimate (all white), iodopotassium iodide (brownish-purple, gradually crystallizing), potassio-mercuric iodide (Mayer's reagent white crystallizing on rubbing), potassio-cadmic iodide and phosphomolybdic acid (both white, gradually turning yellow), potassio-bismuthic iodide (brown, gradually crystallizing), Nessler's reagent (grayish-brown), platinum, palladium and gold chlorides (crystalline, the Au salt soon blackens by reduction), picric acid and potassium bichromate (yellow, crystalline). The characteristic color reaction is obtained by melting the nitrate which turns blue. A solution of a salt with sulphuric acid and potassium bichromate turns blood red or violet red. Solutions of the alkaloid containing an excess of nitric acid soon turn violet red, which color is soluble in alcohol, chloroform and acetic acid, and has almost the same color as methyl violet. The chloride melts at 121° C., the nitrate at 98° C. (at 180° C. blue, at 210°

C. brown, with a quinoline odor), the sulphate at  $160^{\circ}$ – $170^{\circ}$  C., and the platinum double salt at  $165^{\circ}$  C. A combustion makes the composition  $C_{10}H_{15}NO_3$  probable.

*Cinnamon oils.* Holmes (*Pharm. Jour. and Trans.*, 1890, 749) compares the oils obtained from the leaves and from the bark of trunk and branches. The oil from the leaves contains: eugenol, a hydrocarbon with a cymene-like odor, little benzoic acid and a still smaller quantity of cinnamic aldehyde, while the oil from the bark consists principally of cinnamic aldehyde.

*On Peucedanin and Ostruthin.* According to A. Jassoy (*Apoth. Zeit.*, v, 150) peucedanin the bitter principle of *Peucedanum officinale* has the composition  $C_{15}H_{14}O_4$ , and is the methyl ether of oreoselon  $C_{14}H_{11}O_3OH$ , a phenol-like body. By the action of bromine on peucedanin and oreoselon a monobromoreoselon is obtained; nitric acid acting on either gives mononitrooreoselon and styphnic acid. Acid anhydrides do not act on peucedanin, acid chlorides split off methyl chloride and form acid ethers. P. officinale contains another bitter principle, *oxypeucedanin* (Erdmann) in smaller quantity however. *Ostruthin* the bitter principle of *Imperatoria Ostruthium* has the formula  $C_{18}H_{20}O_3$ . It does not contain a methoxyl group but a phenol-like hydroxyl. The ethers can be made with the acid anhydrides while the chloride decompose the ostruthin. Peucedanin is not present in the latter rhizome at any time.

## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, Ph.G.

*The detection of stearic acid in wax* may be easily and certainly made by boiling in a test tube one gram of the sample with 10 cc. alcohol of 80 per cent. for a few minutes, allowing to cool to  $18^{\circ}$ – $20^{\circ}$  C., filtering into another test tube, diluting with water and agitating thoroughly; if as little as 1 per cent. stearic acid was present an immediate flocculent precipitate will be obtained, which collects on the surface of the clear liquid. The test depends upon the insolubility of wax constituents in 80 per cent. alcohol, while sufficient stearic acid is dissolved to yield a precipitate upon dilution.—Dr. H. Röttger, *Chemiker Ztg.*, 1890, 606.

*Mercurial Ointment.*—To secure a rapid extinguishing of the mercury, numerous additions have been recommended with more or

less success; the latest suggestion in this line is to place the mercury and lard in a mortar and to add, from time to time, a small quantity of the suet and triturating until the fats make a homogeneous mass before adding more. By this simple procedure a smooth ointment is obtainable with a decided saving of time.—*L. M., Pharm. Ztg.*, 1890, 354.

*Mineral constituents of ground spices and condiments*—The Bavarian Representatives of Applied Chemistry, at their ninth annual meeting, held in Erlangen, in last May, adopted the following figures as *maximum* ash percentages and ash insoluble in HCl; both of the figures have reference to the air-dried article: Black pepper, 6.5 per cent. and 2 per cent.; white pepper, 3.5 per cent. and 1 per cent.; cinnamon, 5 per cent. and 1 per cent.; cloves, 7 per cent. and 1 per cent.; allspice, 6 per cent. and 0.5 per cent.; mace, 2.5 per cent. and 0.5 per cent.; nutmeg, 5 per cent. and 0.5 per cent.; saffron, 8 per cent. and 0.5 per cent.; ginger, 8 per cent. and 3 per cent.; caraway, 8.5 per cent. and 2 per cent.; fennel, 10 per cent. and 2 per cent.; anise, 10 per cent. and 2 per cent.; marjoram, 10 per cent. and 2 per cent.; paprika, 5 per cent. and 2 per cent.; cardamom, 10 per cent. and 2 per cent.—*Chemiker Ztg.*, 1890, 687.

*Tannin reaction*.—If a tannin solution be boiled for some time with phenylhydrazin and then solution of sodium hydrate carefully added, there will be obtained a beautiful green-blue solution changing to yellow; as neither gallic nor pyrogallie acid give the same test, the reaction is characteristic for tannin, and will serve to detect traces of it. The tannin derivative giving this reaction with sodium hydrate was isolated and gave the hydrazin reaction with concentrated sulphuric acid and ferric chloride. The same body could be obtained from sumach extract, but not from oak-bark extract nor oak-bark infusion.—C. Böttinger (*Liebig's Ann. Chem.*) *Chem. Rpt.*, 1890, 152.

*Lysol* is the name given to a new disinfectant, introduced by Dr. Gerlach, of Wiesbaden, made by boiling for several hours in a flask with invert condenser, proper quantities of an alkali and any fat, fat acid, resin or resin acid with tar oils; after cooling, a mass results which is soluble in water in all proportions. To the aqueous solution may be added desirable quantities of the higher phenols. This preparation is claimed to be superior to carbolic acid, creolin and sulphocarbolic acid in killing bacteria, and is only slightly poison-

ous; it does not irritate wounds; in  $\frac{1}{2}$  per cent. solution it produces on mucous membranes slight burning, which quickly disappears. in 0.3 per cent. solution it will answer as a surgical antiseptic, and in 3 per cent. solution has the properties of a soap, and is used as a disinfectant for the hands.—*Pharm. Post*, 1890, 426.

*Acetanilide*.—The melting point of this important chemical is given in such a wide range ( $112-123^{\circ}$ ) that considerable variability of the commercial product is indicated. Knowing the almost constant presence of toluidine in aniline, and remembering that the former responds to the reagents used in making acetanilide as easily as does aniline, the variations in the melting point of acetanilide may be caused by the presence of acettoluides, which have the following melting points: *Ortho*,  $107^{\circ}$ ; *meta*,  $65.5^{\circ}$ , and *para*,  $147^{\circ}$  C. A very important reaction, which enables one to detect acettoluide in acetanilide, is in the use of a boiling solution of potassium permanganate; acetanilide, if pure, is not altered, and does not reduce the permanganate, while acettoluide is oxidized to acetamido benzoic acid with reduction of the permanganate; of a number of samples of acetanilide examined, only one showed a slight reduction, all the others a decided reduction. A sample of commercial acetanilide (m. p.  $112^{\circ}$  C) after boiling with permanganate until a permanent red color was obtained, filtering, allowing to cool, and repeatedly re-crystallizing gave a product melting at  $114^{\circ}$  C.; no matter how often recrystallized, the crystals melted at  $114^{\circ}$  C. if the preparation was first completely dried at  $105^{\circ}$  C. The acetamido benzoic acid was obtainable from the filtrate of the first acetanilide crystallization by concentrating and adding hydrochloric acid. In addition to the tests for acetanilide given in AM. JOUR. PHARM., 1889, 506, there may be required a melting point at  $114^{\circ}$  C. (after two hours' drying at  $105^{\circ}$  C.); only a slight reduction of permanganate (1 gm. acetanilide dissolved in 30 gm. boiling water should, after adding one drop of a 0.1 per cent. permanganate solution, retain a red color for at least five minutes, and, upon further boiling, should not produce a yellow color or precipitate); and ignition upon platinum without leaving a residue.—E. Ritsert, *Pharm. Ztg.*, 1890, 306.

*Solubility of santonin in castor oil*.—L. Reuter having occasion to dispense a prescription containing santonin and castor oil found that castor oil warmed on a water-bath would dissolve 4 per cent. of its weight of santonin of which the greater part crystallized out again

on cooling. A one per cent. solution, however, made by the aid of heat remained perfectly clear when kept for several days. This is the maximum quantity which will remain in solution.—*Apotheker Ztg.*, 1890, 246.

*Arsenic test.*—The behavior of the hypophosphites towards arsenical solutions (precipitation of metallic arsenic) is brought into prominence again by G. Loeff as a test for arsenic; in sensitiveness it ranks between the tests of Gutzeit and Bettendorf. Ten cc. hydrochloric acid, of any strength or purity, with 0.2 gm. calcium hypophosphite placed in a water-bath for 1–2 hours will enable the detection of  $\frac{1}{100}$  milligram arsenic (Bettendorf's test will detect  $\frac{1}{50}$  milligram). Five cc. sulphuric acid, phosphoric acid or glycerin with 0.2 gm. of a hypophosphite (in the presence of sulphuric acid the sodium salt is best used, in other cases the calcium salt because of its non-hygroscopic character) and 10 cc. concentrated hydrochloric acid warmed in a water-bath for 1–2 hours will show the presence of  $\frac{1}{50}$  milligram arsenic. Of calcium phosphate, sodium phosphate and tartar emetic 0.5 gm. is dissolved in 10 cc. concentrated HCl and 0.2 gm. calcium hypophosphite added, etc. Bismuth subnitrate must first be ignited to remove the nitric acid, and then proceeded with as above; or dissolve equal weights of the subnitrate and hypophosphite in hydrochloric acid and warm. Sulphide of antimony is dissolved in HCl with the aid of a little potassium chlorate before adding the hypophosphite and warming. To test solution of ferric chloride a combination of Bettendorf's test and the hypophosphite test allows the detection of the smallest trace of arsenic: 5 cc. of the solution mixed with 10 cc. HCl are decolorized by addition of Bettendorf's test solution, then the hypophosphite added and warmed. Most of the commercial solutions of ferric chloride were found to contain arsenic.—*Apotheker Ztg.*, 1890, 263.

*A morphimetric assay of opium* for which is claimed purity of the morphine obtained, the alkaloid being almost white and immediately soluble in 100 parts lime water, considerable saving of time, and, constant results, the extreme differences of a number of assays being within 0.3 per cent. (the results of this method are always about 1 per cent. lower than by Dieterich's method) is as follows: 5 grams of the finely powdered opium are triturated with water and made up to 78 gm.; after frequently agitating during 1–2 hours, 60.8 gm. (representing 4 grams opium) are filtered off and in it dis-



solved 0.2 gm. oxalic acid. After one-half hour 5.2 gm. of a solution of potassium carbonate (1 : 2) are added, thoroughly mixed (avoiding unnecessary agitation) and 16.5 gm. filtered at once through a dry plaited filter of 12 cm. diameter into a tared flask of 30 cc. capacity. To the 16.5 gm. filtrate (representing 1 gm. opium) add 5 grams ether free from alcohol, cork the flask and agitate briskly for 10 minutes; the ether is then evaporated by use of a small rubber blast, the morphine collected on a small plain filter and thoroughly washed with water saturated with ether, dried at 40–50° C., returned to the flask which has been dried in the meantime and weighed to constant weight.

The addition of the oxalic acid is made to precipitate calcium salts which are present in all opium varieties excepting Salonica opium which gives no perceptible precipitate; by the use of a large excess of potassium carbonate the narcotine is completely and immediately precipitated while no morphine is precipitated in the minute's time necessary to filter off the 16.5 gm. filtrate.

This method has also been applied to the examination of *extract* and *tincture of opium*. 2.5 gm. *extract* are dissolved in water with the addition of 0.2 gm. oxalic acid, diluted to 70 gm., 5 gm. solution of potassium carbonate added, 15 gm. filtered off (corresponding to 0.5 gm. *extract*), etc., as above.

Fifty gm., with 0.2 gm. oxalic acid, are evaporated to a thin *extract* and gradually diluted with water to make 70 gm.; to this add 5 gm. solution of potassium carbonate and filter off 15 gm. (corresponding to 10 gm. *tincture*) and proceed as above.—G. Looff, *Apotheker Ztg.*, 1890, 271.

*Cooling ointments* are defined by Unna as mixtures of fat and water which, applied to the skin, produce a sensation of cold, owing to the evaporation of the water. They are to be preferred to the usual fat ointments which prevent the normal water-evaporation and which are often of injurious action. Lanolin, owing to its ready miscibility with water and aqueous solutions, was thought to be the best base for such ointments, but experiment did not confirm this; its effect is cooling at first, but this quickly disappears and gives way to a sensation of warmth. It was found that mixtures of lanolin and fats mix with large quantities of water and these mixtures had a permanent cooling effect. The proportions of *anhydrous* lanolin : fat : water are 10 : 20 : 30 for cooling ointments. Lanolin-

fat-ointments, with a maximum amount of water, are called *cream ointments*, owing to their appearance. *Ungt. refrigerans*: Anhydrous lanolin, 10; benzoinated lard, 20; rose water, 30. Uses: Same as cold cream. *Ungt. refrigerans aquæ calcis*: Anhydrous lanolin, 10; benzoinated lard, 20; lime water, 30. Uses: In burns. *Ungt. refrigerans plumbi subacetici*: Anhydrous lanolin, 10; benzoinated lard, 20; solution of subacetate of lead, 30. Uses: Same as Goulard's cerate. *Ungt. refrigerans zinci*: Anhydrous lanolin, 10; benzoinated zinc ointment, 20; rose water, 30. Used in place of zinc ointment. *Ungt. refrigerans ichthyoli*: Anhydrous lanolin, 10; benzoinated lard, 20; distilled water, 24; ichthyol, 6.

*Cremor refrigerans*, *Cremor refrigerans aquæ calcis* and *Cremor refrigerans plumbi subacetici* differ from the corresponding *ointments* in containing 60 parts of the aqueous liquid instead of 30 parts. It is recommended to prepare all of these ointments extemporaneously. —(*Therap. Monatsh.*) *Pharm. Centralhalle*, 1890, 303.

*Myrrh.*—A chemical examination of myrrh proved it to contain gum, resin and volatile oil. That portion soluble in water, but insoluble in alcohol, was found to be a gum of the carbo-hydrate formula  $C_6H_{10}O_5$ . The portion soluble in alcohol is a mixture of several resins, the greater part of which is an *indifferent* soft resin; soluble in alcohol and ether, of the formula  $C_{26}H_{34}O_5$ , containing three replaceable hydroxyl groups; there are also soluble in alcohol two dibasic acids of the formulas  $C_{13}H_{16}O_8$  and  $C_{26}H_{32}O_9$ . The volatile oil is present in larger quantity (7–8 per cent.) than has been previously found (2.18 per cent.), by far the greater part consists of a body of the formula  $C_{10}H_{14}O$  isomeric with thymol and carvol, but apparently a different substance. The formulas for the part soluble in alcohol show a certain relationship. If the formula  $C_{13}H_{16}O_8$  be doubled there will result the three formulas  $C_{26}H_{34}O_5$ ,  $C_{26}H_{32}O_9$  and  $C_{26}H_{32}O_{16}$ , showing that the differences in the resins are due to different stages of oxidation. The essential oil, upon exposure, will assume the consistence and other appearances of myrrh.—Dr. O. Köhler, *Arch. der Pharm.*, 1890, 291–313.

*Manganese preparations* have recently been tried again in the treatment of chlorosis and excellent results were obtained especially with a peptonate. E. Dieterich, in *Pharm. Centralhalle*, 1890, 327–333, publishes the results of his efforts in making the so-called “indifferent manganese preparations,” from which the following are taken:

*Liquor Ferro-mangani peptonati.*—10·0 citric acid are dissolved in 50 cc. distilled water and neutralized with ammonia water (about 20·0 are necessary). 24·0 liq. ferri peptonati (see AM. JOUR. PHARM., 1888, 514) are carefully boiled with 150·0 distilled water until dissolved, the ammonium citrate solution added and also a solution of 3·7 pure crystallized manganous chloride in 10·0 distilled water; the following mixture is next added: 500·0 distilled water, 100·0 cognac, 0·75 each of tinctures of Ceylon cinnamon and vanilla, 1·5 aromatic tincture and 2 drops acetic ether; finally sufficient water to make 1000·0. The above directions must be strictly followed and then will furnish a preparation containing 0·6 per cent. iron and 0·1 per cent. manganese.

*Manganese saccharate, M. mannitate and M. dextrinate.*—75·0 pure permanganate of potassium are dissolved by the aid of heat in 4500·0 distilled water and allowed to cool; with stirring 45·0 white sugar or 45·0 alcohol are added and set aside for 24 hours. The precipitate is washed, by decantation, with distilled water until the washings leave no residue upon evaporation; it is then collected upon a cloth strainer and expressed until it weighs 300·0. The moist precipitate is next triturated with 900·0 sugar, mannite or dextrin, as the case may be, 225·0 solution of sodium hydrate added and warmed in a closed vessel in a steam-bath until a drop taken out dissolves perfectly in water; it is then evaporated to dryness and powdered.

The preparations contain 3 per cent. manganese; by taking only 225·0 sugar, mannite or dextrin instead of 900·0 preparations containing 10 per cent. manganese can be made. These preparations are easily soluble in water; concentrated solutions are permanent, dilute solutions of the saccharate precipitate after a time, but of the other two are permanent. The solutions can be acidified with *citric acid* without precipitation.

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**"Eucalyptus rostrata in sea-sickness."**—Dr. Russell (*British Medical Journal*, February 22, 1890) finds the eucalyptus rostrata "red gum" more effective in checking sea-sickness than any of the other remedies hitherto recommended. He finds lozenges, each containing one grain of the eucalyptus gum, the most convenient form of administration, one being taken when sickness is coming on.

**Action of Hydracetin.**—Oestreicher has found this remedy (*Berl. klin. Woch.*) of some slight service in psoriasis, but apt to give rise to so alarming symptoms of poisoning that it cannot be commended.—*N. Y. Med. Jour.*, April 5, 1890.

DETERMINATION OF LUPULIN IN HOPS.<sup>1</sup>

BY F. REINITZER.

A portion of the hops (not weighed) is sifted by Haberlandt's process, and any grains which pass through the sieve removed with forceps. The lupulin is then weighed, shaken, and washed with chloroform into a dry filter, in which it is then wrapped and extracted with chloroform for about an hour. When dry, it is removed from the filter-paper to the weighing glass previously used, and weighed. The amount of lupulin husks is thus determined, and that of the lupulin found by subtracting this amount from the original weight.

A second weighed portion of the hops is then extracted with chloroform in a Soxhlet's apparatus, shaken on a sieve, the pieces of leaf removed with forceps, and the lupulin brushed through. The sifted portion is again sifted to obtain it free from grains. The pure lupulin husks are now weighed, and from the numbers, with the help of those previously obtained, the original weight of lupulin is calculated. The method gives much more concordant results than that originally employed by Haberlandt, and gives a better insight into the composition of hops than was previously possible. Examples of analyses are given which support this statement.

## CAFFEINE TRI-IODIDE.

BY P. W. SQUIRE.

As paragraphs relating to this compound have appeared in the "Commentary" of *The Chemist and Druggist*, February 15 and May 3, and as some uncertainty seems to exist regarding the constitution of the body prescribed under this name, the following notes may be of interest.

For the confusion of formulæ which has arisen in connection with the subject, the original paper by Professor Tilden (*Four. Chem. Soc.*, 1865, page 99) is primarily responsible. After reading that "the results of experiments undoubtedly point to the formula  $2(\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2\text{I}_3)\cdot 3\text{H}_2\text{O}$ ," one does not naturally expect to find the author, after further experiment, altering the formula on the succeeding page to  $2(\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2\cdot \text{HI}\cdot \text{I}_2)\cdot 3\text{H}_2\text{O}$ , a change which gives a totally different idea of its constitution and method of preparation. Misled by the

<sup>1</sup> *Bied. Centr.*, xviii, 859. Reprinted from *Jour. Chem. Soc.*, April, p. 431.

want of visible connection between the two statements, *The Chemist and Druggist* commentator of May 3 gave Tilden's corrected formula as belonging to a closely-related but different compound to that denoted by the provisional and incorrect formula given on the previous page; and the printing of the latter in the paragraph of February 15 (copied into the *Pharmaceutische Zeitung*) has given an opportunity to Dr. Scholvien to add to the confusion by proving at considerable length that no body with such a formula could possibly exist.

When I was first asked by Dr. Mortimer Granville to prepare a quantity of the salt, Tilden's second formula was overlooked altogether, and his original directions were implicitly followed; but it soon became evident that the rapidity with which the crystals formed was directly proportional to the liberation of iodine from the excess of hydriodic acid present, an old and decomposed acid being far better for the purpose than a freshly-prepared and colorless acid.

The next experiment was to use an acid containing a quantity of added iodine, when a crop of crystals was quickly obtained, more than double the weight of the added iodine, the resulting inference being that two-thirds of the total iodine was practically in the "free" state, and the compound, instead of being a tri-iodide, was really (as indicated by Tilden) the normal hydriodide (hydriodate) of caffeine, with two loosely-combined atoms of iodine, whence its usefulness in therapeutics. Analytical results obtained by my assistant, Mr. Robert Thomson, completely confirm this view, and corroborate those obtained by Professor Tilden, except in regard to the water of crystallization, which we think in no case exceeds  $1\text{H}_2\text{O}$  in the molecular compound.

The following are the percentage results obtained from some well-formed crystals:

	Experiment.	$\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2 \cdot \text{HI} \cdot \text{I}_2 \cdot \text{H}_2\text{O}$
Caffeine (anhydrous), . . . . .	32.4	32.66
Hydriodic acid, . . . . .	21.59	21.55
Iodine, . . . . .	42.67	42.76
Water, . . . . .	3.1	3.03
	<hr/>	<hr/>
	99.76	100.00
Total iodine, . . . . .	64.09	64.14

The constitution of the body may be shown by either of the three following methods: (1) By treatment with cold water iodine is liberated to the extent of 42 per cent. (two-thirds of the whole),



and may be titrated by hyposulphite. (2) By treatment with caustic soda, five-sixths of the "free" iodine is converted into iodide, and one-sixth into iodate of sodium; so that of the total iodine, eight-ninths (57.28 per cent.) is precipitated by silver nitrate from a solution containing excess of ammonia (in which silver iodate is soluble), and the remaining ninth (7.13 per cent.) on the addition of sulphurous acid, the theoretical percentages being 57.02 and 7.12, respectively. (3) By treatment with water and carbon bisulphide, or by boiling with water alone, the loosely combined iodine may be removed, and on evaporation the colorless liquid yields crystals of the ordinary hydriodide.

A complete synthesis of the salt has been effected by dissolving the theoretical quantities of caffeine and free iodine in hot hydriodic acid, previously saturated in the cold with the "tri-iodide," when the theoretical quantity of this di-iodo-hydriodide crystallized out on cooling.

As the still more highly iodized compounds of caffeine present many features of interest, both chemically and therapeutically, experiments on their preparation and properties are still proceeding.—*The Chemist and Druggist*, May 10, p. 636.

## PHYSIOLOGICAL ACTION OF THE ACTIVE PRINCIPLES OF JEQUIRITY.<sup>1</sup>

BY S. MARTIN AND R. N. WOLFENDEN.

Klein has shown that the poisonous properties of the seeds of *Abrus precatorius* (jequirity) cannot be due to a bacillus, and Warden and Waddell (Non-bacillar nature of Abrus poison, Calcutta, 1884) showed it to be due to the action of a poisonous proteid. The proteids in the seeds are two in number, a globulin and an albumose, and the present paper relates to the physiological action of the first of these. The proteids were obtained by extracting the crushed seeds with 15 per cent. solution of sodium chloride; they were precipitated from this extract by saturation with ammonium sulphate; the precipitate was redissolved by adding water; and from this solution the globulin was precipitated by dialysis, collected, washed and dried.

<sup>1</sup> *Proc. Roy. Soc.*, 46, 94—100. Reprinted from *Jour. Chem. Soc.*, April, 1890, p. 398.

The actions ascribable to this globulin are the production of local œdema and inflammation when subcutaneously injected or applied to the eye, the presence *post mortem* of petechiæ beneath the serous membranes, and the occurrence of hæmorrhagic gastro-enteritis. It also produces a remarkable fall of body temperature after subcutaneous injection, and in lethal doses, it causes rapidity of breathing shortly before death. It has little or no effect on blood pressure. The activity of this globulin is destroyed by heating the solution to 75° or 80°, the temperature at which it enters into the condition of a heat coagulum.

In a second paper (*Ibid.*, pp. 100-108) S. Martin describes the toxic action of the *albumose* which was obtained by precipitating the proteids of the seeds by means of alcohol. The precipitate was allowed to remain under absolute alcohol for several months; the globulin was thus rendered insoluble; the albumose, however, was freely soluble in water after this treatment. It gave the following reactions: The aqueous solution was neutral to litmus-paper, and gave no precipitate on boiling. Acetic acid and also nitric acid gave precipitates which dissolved on heating, and reappeared on cooling. Copper sulphate gave a precipitate soluble in excess of the reagent. Copper sulphate and potash gave a "biuret" reaction. Mercuric chloride gave a precipitate insoluble in excess of the reagent. The symptoms produced by the albumose closely resemble those noticed when the globulin is hypodermically injected. There is gradually increasing weakness, with rapid breathing and lowering of body temperature, but no convulsions or paralysis. It also causes severe conjunctivitis when applied to the eye. Its poisonous properties are lessened by heating at 70-75°, and completely destroyed at 85°.

The albumose is not, however, so powerful a toxic agent as the globulin, the dose necessary to produce the same effects being larger.

A comparison is drawn between the action of these proteids and those of other poisonous substances of the same class, especially those in snake-venom.

The following table contrasts the activity of the venom of various snakes and of *Abrus*:

*Common adder.*—Fatal dose in man, 0.0021 gram per kilo. of body weight (Fontana).

*Australian tiger-snake*.—Fatal dose in dog, 0.00485 gram per kilo. of body weight.

*Cobra*.—Fatal dose in dog, 0.000079 gram per kilo. of body weight (Vincent Richards).

*Abrus poison*.—

*Globulin*.—Fatal dose, 0.01 gram per kilo. of body weight.

*Albumose*.—Fatal dose, 0.06 gram per kilo. of body weight.

*Peptic albumoses*.—Fatal dose in dog, any dose over 0.3 gram per kilo. of body weight (Pollitzer).

### METHYSTICIN.<sup>1</sup>

BY C. POMERANZ.

This compound exists in the root of *Macropiper methysticum*, from which it may be best prepared by exhaustion with boiling 80 per cent. alcohol; the solution is concentrated and allowed to remain in a cool place for some days, when a crystalline deposit separates, and this on recrystallization from boiling alcohol furnishes pure methysticin in the form of inodorous, tasteless, prismatic needles melting at 137°. It has the formula  $C_{15}H_{14}O_5$ , is insoluble in cold water, only slightly soluble in hot water, light petroleum and ether, but is readily dissolved by boiling alcohol, and cannot be distilled unchanged. On treatment with potash or soda, the compound is dissolved with formation of the potassium or sodium salt, respectively of an acid which the author has named *methysticinic acid*. The free acid,  $C_{14}H_{12}O_5$ , crystallizes in yellow, prismatic needles resembling piperic acid, is sparingly soluble in ordinary solvents, dissolves readily in solutions of the alkalis, melts at 180° with evolution of carbonic anhydride, and is colored red by a solution of ferric chloride. On oxidation with a solution of potassium permanganate, it is converted into a compound identical with Fittig and Remsen's piperonylic acid,  $CH_2 \cdot O_2 \cdot C_6H_3 \cdot COOH [O_2 : COOH = 1 : 2 : 4]$ , which melts at 227°, and gives a characteristic calcium salt.

*Methysticol* is obtained on boiling methysticinic acid with alkalis or dilute acids. It melts at 94°, is insoluble in alkalis, but is readily dissolved by alcohol or ether, crystallizes in flat prisms, forms a compound with phenylhydrazine, which melts at 143°, and has the formula  $C_{13}H_{12}O_3$ .

<sup>1</sup> *Monatsh.*, x, 783-793; reprinted from *Jour. Chem. Soc.*, March, 1877.

In consideration of its behavior with potash, methysticin must be regarded as the methyl salt of methysticinic acid,  $\text{CH}_2\text{O}_2\text{C}_6\text{H}_3\text{C}_7\text{H}_7\text{O}_3$  [ $\text{O}_2 : \text{C}_7\text{H}_7\text{O}_3 = 1 : 2 : 4$ ], the group  $\text{C}_7\text{H}_7\text{O}_3$ , if methysticinic acid is regarded as a  $\beta$ -ketonic acid, being represented by the chain  $-\text{CH}:\text{CH}:\text{CH}:\text{CH}:\text{CO}:\text{CH}_2\text{COOH}$ . The author has not succeeded in detecting the least trace of benzoic acid in the oxidation-product of methysticin (compare Nölting and Kopp, *Mon. Sci.*, 1874. 921).

### BARK OF QUINA MORADA.<sup>1</sup>

(*Pogonopus febrifugus*, *Bentham et Hooker*.)

BY P. N. ARATA AND F. CANZONERI.

The authors have examined a specimen of bark found in Bolivia and in the north of the Argentine Republic, commonly known as "cascarilla" or "quina morada," and credited with many of the therapeutic characteristics of the true cinchona bark. For a variety of reasons the authors consider it to belong to the *Pogonopus febrifugus*, *Bent. et Hooker*. In appearance the bark is irregular on the outside and scaly within; the color varies from yellowish white to reddish, and is a dirty white on freshly-exposed surface; it is soft and spongy to the touch, a little lighter than water, has a slightly bitter taste, scarcely any odor and burns very readily, leaving a white ash. It imparts a bluish fluorescence to water with which it has been boiled, and a yellowish blue fluorescence to alcohol.

The substance was extracted from this bark, namely, a blue fluorescent substance, moradin, and an alkaloid, moradeine.

To isolate these, the powdered bark is extracted with alcohol, the extract treated with an alcoholic solution of lead acetate, filtered, freed from lead and concentrated, when a crystalline deposit of moradin is obtained. The mother liquor is then treated with potash and ether, the ethereal extract treated with hydrogen chloride, and the precipitate of moradeine hydrochloride purified by again treating it with soda, water, etc.

Moradin contains no nitrogen, and its formula is either  $\text{C}_{21}\text{H}_{18}\text{O}_8$  or  $\text{C}_{17}\text{H}_{14}\text{O}_6$ . The former agrees better with the composition of the acetyl derivatives triacetylmoradin.

Moradin crystallizes in slender, colorless needles, or in large

<sup>1</sup> *Gazzetta*, xviii, 409-421. Reprinted from *Jour. Chem. Soc.*, April, 1890, p. 404.

anhydrous prisms, and melts at 201–202°. It has the characters of an acid, but none of its salts could be isolated. Alkalies increases, and acids (except acetic) diminishes the fluorescence of its solutions. Ferric chloride gives a green coloration, and, after a time, a green precipitate, gold chloride gives a blue coloration and green precipitate. It is dissolved by concentrated sulphuric acid, forming a yellowish solution, from which it is re-precipitated unchanged on adding water. Although not a glucoside, it reduces Fehling's solution when heated with it; it also reduces silver nitrate and basic lead nitrate. Potassium permanganate in alkaline solution and ferric chloride in alcoholic solution oxidize it to quinone. The action of nitric acid is characteristic; the concentrated acid has no action in the cold, but forms oxalic acid on heating. On boiling with very dilute (4 per cent.) acid, quinhydrone and quinone are successively formed. Its reactions place it in the class of oxyhydroquinones, since it gives as products of decomposition a di or trihydroxybenzoic acid, which colors ferric salts green, a polyvalent phenol, probably hydroxyquinol and quinone. It is probable that two of the oxygen atoms are contained in the same way as in hydroxycoumarin (umbelliferon).

Triacetylmoradin crystallizes from its alcoholic solution in white, shining prisms which melt at 177 to 178°. It is not fluorescent, and has no acid properties. It is insoluble in alkalies in the cold, and decomposes when warmed with them.

Moradeine crystallizes in opaque, colorless prisms, very soluble in alcohol, ether, chloroform, etc., but only slightly in water. It melts at 199–200°, and exhibits the general reaction of an alkaloid, forming a well crystallized platinochloride and aurochloride, etc.

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#### TRUE WINTER'S BARK.<sup>1</sup> (*Drymis Winteri*, *Forster.*)

By P. N. ARATA AND F. CANZONERI.

After an historical summary of the introduction of the bark into Europe, the author describes the genuine bark from the Straits of Magellan; this occurs in the form of deeply-furrowed, curled-up fragments with an earthy fracture, exhibiting, when in small pieces, an internal reddish-brown coloration. When fresh, it has a bitter and pungent taste and an agreeable odor, recalling both turpentine

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*Gazzetta*, xviii, 527–539. Reprinted from *Jour. Chem. Soc.*, April, p. 405.



and cloves. The sun-dried bark yielded: water (at  $110^{\circ}$ ), 13.713 per cent.; ash, 3.338 per cent.; soluble in ether, 3.841 per cent.; in alcohol, 6.465 per cent.; in water, 13.981 per cent.; ligneous matter, 49.200 per cent. An analysis of the ash is also given. The ethereal solution contains a peculiar essence, fatty compounds, resins, and waxy matter; the alcoholic extract contains reddish uncrystallizable resins. Citric acid was carefully looked for, but not found. The essence was isolated by distilling the bark with water, exhausting the distillate with petroleum, and distilling off the solvent. The crude oil, amounting to 0.6428 per cent. of the weight of the bark employed, is a mixture of several substances.

*Winterene*,  $C_{15}H_{24}$ , is the essential oil separated from this by fractional distillation. It passes over between  $260^{\circ}$  and  $265^{\circ}$ ; sp. gr. at  $13^{\circ}$  = 0.93437. Index of refraction = 1.4931; sp. rotatory power at  $16^{\circ}$   $[a]_D = + 11.2$ . It is readily oxidized on exposure to the air, becoming yellow. The formula  $C_{25}H_{40}$  was calculated from the ultimate analysis and vapor-density, but the authors consider that the ready oxidizability of winterene and its analogy to similar essences points rather to the formula  $C_{15}H_{24}$ , which would place it in the group of sesquiterpenes, such as cedrene, cubebene, etc., the boiling points of which are between  $250^{\circ}$  and  $268^{\circ}$ .

Iodine dissolves in winterene producing a greenish-yellow coloration which changes to green after a time.

On adding picric acid containing a few drops of sulphuric acid to winterene, a yellowish-red, crystalline compound is formed.

Pure winterene is colored green by a solution of bromine in chloroform, orange-red by a solution of chloral hydrate in sulphuric acid, rose to yellow by concentrated sulphuric acid or by sulphuric acid and chloroform, dirty-yellow by Fröhde's reagent and by ferric chloride and sulphuric acid, rose to violet by nitric acid.

The reactions of the essence after oxidation are also given.

## THE INDIAN GRASS OILS.<sup>1</sup>

By F. D. DODGE.

These are at least five in number, namely, oils of citronella, lemon-grass, Indian or Turkish geranium, ginger-grass, and vetivert or cus-cus. They are derived from various tropical grasses of the

<sup>1</sup> *Amer. Chem. J.*, xi, 456-469. Reprinted from *Jour. Chem. Soc.*, March, 1911.

genus *Andropogon*, but there is some confusion as to the particular species from which the individual oils are obtained.

*Citronella Oil*.—The commercial varieties are often adulterated with kerosene; the pure oil is a clear, greenish-yellow liquid with a sharp burning taste and a strong aromatic odor. Its sp. gr. at 16° is 0.8770, at 26.5°, 0.8750. It distils between 200° and 240°, leaving 10 per cent. of a thick oily residue, having a pungent odor. It gives most of the reactions of aldehydes, combining with hydrogen sulphites and with phenylhydrazine, although not with ammonia; it also reacts with acetic and benzoic chlorides, and gives a mirror with an ammoniacal silver solution. Two litres of the oil were distilled in a current of steam, and collected in fractions of 1,100 cc. and 400 cc., the residue of 500 cc. not being readily volatile. The first fraction (1,100 cc.) was treated with a solution of sodium hydrogen sulphite, the mixture being kept cool with ice and water. The liquid solidified to a white magma, and the sodium hydrogen sulphite compound was then pressed between flannel and washed with ether; the filtrate yielded 350 cc. of residual oil. The sodium hydrogen sulphite compound was mixed with dry sodium carbonate and distilled in a current of steam; about 700 cc. of aldehyde was thus obtained. This was shown by analyses, and a vapor-density determination, to have the formula  $C_{10}H_{18}O$ , and is thus isomeric with borneol and geraniol. The author names it *citronellic aldehyde*, and considers it to be  $\beta$ -methyl- $\delta$ -isobutylallyl acetaldehyde,  $C_4H_9 \cdot CH \cdot CH \cdot CH(CH_3) \cdot CH_2 \cdot CHO$ , since this formula is most in accordance with its reactions. It unites with 2 atoms of bromine, and when reduced with sodium amalgam and acetic acid it yields *citronellyl alcohol*,  $C_{10}H_{20}O$ , boiling at 225–230°; this decolorizes bromine solution, and has a pleasant odor of roses. It forms compounds with phenylhydrazine, with aniline and paratoluidine, and with acetic acid, but these products have not yet been isolated. It is dextrorotatory, and when oxidized, appears to yield fatty acids; with potassium permanganate, it yields a mixture of acids smelling strongly of ordinary valeric acid. When treated with phosphoric anhydride, some large colorless plates (melting at 140°) were deposited, and two oils formed, one boiling at 175°, which was shown by analysis to be an impure terpene, and one boiling above 300°, which had a pleasant odor resembling the high-boiling fractions of citronella oil.

The 350 cc. filtered from the sodium hydrogen sulphite compounds yielded (1) 75 cc. of a light oil, boiling at 177°, and having a pleasant, citrene-like odor; this was analyzed and its vapor-density determined, the results indicating that it was an impure terpene; (2) 120 cc. of a thicker oil, of rose-like odor, boiling at 222–224°, and of sp. gr. = 0.8741 at 26.5°, which appeared to be citronellyl alcohol; (3) 100 cc. boiling above 240°, dark brown, viscid, and having a peculiar odor.

The residual 500 cc. of the original oil, not readily volatile in steam, was treated with sodium hydrogen sulphite, and yielded about 10 cc. of citronellic aldehyde, and a residual 475 cc. which, when distilled, behaved like the residue from the other sulphite precipitate, but yields a much larger amount of high-boiling products, which oxidize readily and are difficult to treat. Citronella oil therefore contains citronellic aldehyde and alcohol, together with a terpene and oils boiling above 240°. The study of these oils is to be continued.

## ON MEDICINAL GELATINS.<sup>1</sup>

BY DR. UNNA.

These preparations are indicated in superficial inflammatory affections when the skin is swollen, wet and itchy. Very high temperatures and profuse sweating forbid their use. For a general basis the following formula is given—the figures within parentheses being taken when a hard zinc gelatin is wanted.

R—Zinc oxide, . . . . .	15 (10)
Gelatin, . . . . .	15 (30)
Glycerin, . . . . .	25 (30)
Water, . . . . .	45 (30)

In adding other drugs, the following directions may be useful:

(1) Cerussa, iodide of lead, white precipitate, sulphur, iodoform, chrysarobin in fine powder may be mixed in any proportion required. A proportion of five to ten per cent. added to soft zinc gelatin is recommended.

(2) Carbolic and salicylic acid, resorcin, naphthol, creasote and sulphide of potassium may be added to the hard gelatin basis in any proportion up to ten per cent.

<sup>1</sup> *Deutsch. med. Zeit.*, Nov. 4, 1889. Reprinted from *The Medical Chronicle*, March, 1890, p. 508.

(3) Fats, balsams, tars and ichthyol all make the basis softer. The proportion added is usually from ten to twenty per cent.

(4) If we wish to combine drugs in rules 2 and 3, then the sum of the proportions must be attended to. For example, if resorcin and salicylic acid were both ordered, we should not prescribe more than five per cent. of each if we wish the gelatin to form a good covering.

(5) Powders may be combined in any proportions.

(6) Tannin, pyrogallol and oxide of mercury cannot be added to the basis.

(7) Corrosive sublimate up to three per cent, camphor, chloral, and camphor chloral all to two per cent., ext. cannab. indic. from two to five per cent., may be used with soft zinc gelatin.

The chemist is to dispense the different glues in pots, which are to be put in boiling water when the preparation is to be used. It is to be painted on the skin with a long-haired brush.

The diseases of the skin for which Unna's glues are recommended are :

*Pruritus*.—Zinc glue with ext. cannab. indic., chloral hydr., carbolic acid, creasote, salicylic acid, camphor, camphor chloral, etc.

*Artificial Erythema and Eczema*.—Two per cent. ichthyol or five per cent. sulphur instead of ordinary dusting powders.

*Eczema Intertrigo*.—Hard zinc glue with ten per cent. ichthyol or five per cent. resorcin.

*Eczema, with Great Itching*.—Two per cent. ichthyol or five per cent. ext. cannab. indic.

*Peeling after Acute Eczema*.—Two per cent. ichthyol or resorcin, five per cent. sulphur, or one per cent. salicylic acid.

*Ichthyosis*.—Two per cent. resorcin or five per cent. sulphur and ten per cent. fat.

*Wounds and Ulcers*.—Iodoform zinc glue.

*Acne Pustulosa*.—After opening the pustules paint with twenty per cent. sulphur or five to ten per cent. resorcin, one per cent. perchloride of mercury with or without two per cent. salicylic acid added to the zinc glue.

The soft zinc glue will form a useful protection to the sound skin near diseased areas, to which strongly irritating applications have to be made.

MANIOC, OR CASSAVA.

BY E. CHENERY, M.D., of Boston.

From the brief allusions to this substance by writers on *materia medica*, one would get but a slight idea of its importance as an article of diet in tropical countries, being the staple food for unnumbered millions of human beings—the staff of life in the West Indies, Brazil and on the Continent of Africa.

The plant from which this food is derived is known to botanists as *Xanipha Manihot*, and is a shrub, six to twelve feet high and one or two inches in diameter. Except for the young leaves, which are used as greens, its whole value consists in its tuberous roots, which sometimes reach the enormous weight of thirty pounds, but usually range from one to three inches in diameter and from six to eighteen inches in length. The shrub is said to be a native of Brazil, where it is known as *mandioca* or *tapioca*. Cassava (or cassava) is its name in the West Indies. It is not grown from the seeds, but from cuttings, having surprising vitality; for a cane of it, like Aaron's rod, will bud and grow leaves in your hand. Hence, it is only necessary to cut the stick into pieces of six to twelve inches in length, and thrust them into the ground, and it matters little whether the ground has been first broken for it or not. In eight to eighteen months the tubers are in their best state to produce the nutritious food—seventy per cent. gluten and thirty of starch; but, at a later period, the gluten becomes less and the starch increases. There is no food product which compares with it in resisting drought. Even in the dryest seasons, it is like other trees "planted by the rivers of water," and whole fields are green with its foliage, while all else is brown with the scorching sun.

There are two varieties of the manioc, known as the sweet and the bitter; the first of which may be eaten with impunity, while the latter has a bitterish, milky juice, which is poisonous from containing prussic acid. But these roots are grated or otherwise reduced to a pomace, and then suspended in grass bags, when the poisonous juice drips out, or, being volatile, is dissipated by the heat in baking bread from it. The bitter variety is the principal kind used in British Guiana, while the sweet is the one mostly cultivated in Africa. The tapioca which comes into our houses is almost pure starch, and is made from the expressed juice of



the root, which, on standing, deposits in the form of powder, and which, if dried without heat, will remain so. If heat be applied, it takes the form of the irregular masses we are accustomed to see.

The root has the taste of chestnuts, and may be eaten raw. It is delicious, wholesome food when roasted in hot embers or broiled. If soaked till the skin can be drawn off and the fibrous heart drawn out and then dried, it makes good bread; or, if broken up and fried in palm oil and salted, it is a good relish, and the Africans call it *bomba*.

An extremely white and fine flour, called *fuba*, is made from the soaked and dried roots, and it is the chief food in Angola.

The flour makes a thick porridge or mush—*funje*. The water is boiled and salted and set off the fire; after which *fuba* is stirred in until it can be cut into blocks, which may be taken in the hands and eaten with molasses or dipped into chicken broth.

The staff of life on the Congo is *quanga*, or bread made from the manioc by soaking, peeling and pounding the soaked root into a pomace, and kneading and making into dough-loaves of four by six or ten inches. These loaves are wrapped in thin, tough leaves and bound, and then boiled in large earthen pots. Then the bread is ready for use; or it may be sliced and browned or broiled, as one prefers.

Farina from the manioc is prepared by grating the green root, drying in the sun, with all the starch and tapioca in it, browning it slowly over the fire; after which it is eaten by stirring it into soup or boiled beans.

Grate, strain and dry slowly in the sun, and you have a starch for puddings or any other purpose for which starch has demand in the market. Gluten being a nerve-food, indispensable to health and vigor of both body and mind, the great abundance of it in the cassada—nearly three times as much as in wheat flour—the cassada is pre-eminently "the staff of life," since there is no way by which its abundance of gluten can be wasted in preparation, as in wheat. There is a Providence here which shapes ends, since this chief food for tropical regions has so much nerve-supplying elements and so little of the heating elements, as compared with food in colder climates.

But this abundant gluten, as compared with other foods for the sick, pre-eminently fits it for the sick-room, and especially so when

we wish to increase strength instead of heat, and where any irritating and indigestible food-substances are forbidden. It requires longer boiling than starchy foods in general, and may be used in the form of thin mucilage or demulcent, or in a more solid form with sugar, lemon juice, nutmeg or other aromatics. I suspect that, as physicians, we should make immense gain in restoring from prostrating sicknesses by using more of this eligible substance in place of so much meat slops, and especially so in cases complicated with more or less gastric irritation. Meat foods must be excluded from the stomach in gastric ulcer. Why not, then, fall back upon this highly nitrogenous food for supporting the strength? Having so large a proportion of gluten over the starch, it offers immense advantages over wheaten and other bread in cases of diabetes where any starch at all is allowable.—*The Times and Register*, April 5, p. 318.

#### ADULTERATION OF FOOD.<sup>1</sup>

In his annual address, delivered Jan. 23, 1890, before the Chemical Society of Washington, the retiring President, Mr. Edgar Richards, said that, from want of reliable information in regard to the materials employed in most new food products, there is a general feeling of uncertainty and insecurity on the subject. People, as a rule, imagine that any substance used as an adulterant of, or a substitute for, a food product is to be avoided as itself being injurious to health; and when they hear that a certain food is adulterated, or is a food substitute, there is immediately a prejudice excited against the article, which it takes time and familiarity to allay. A moment's reflection ought to show that it would be directly contrary to the food manufacturer's interest to add to, or substitute anything for, a food product which would cause injurious symptoms, as in that case his means of gain would be cut off by the refusal of consumers to buy his product. It is true that the unscrupulous manufacturer or dealer does not hesitate to cheat his customer in the interest of his own pecuniary profit and gain, but he does not want to poison him. Where, through carelessness or ignorance, injurious substances, such as the arsenic, copper, aniline, and other metallic and organic poisonous salts sometimes used for

<sup>1</sup> *Science*, Feb. 7. Reprinted from *Med. and Surg. Rep.*, June 14.

artificial colors, are added to foods, their presence is promptly revealed by the dangerous symptoms which they call forth in the consumer. About a year ago, some Philadelphia bakers added chromate of lead to color their cakes, and caused the death of several persons, and serious illness in nearly every one who ate any of these products.

The great majority of substances used for food adulterants or substitutes consist of cheap and harmless substances, which are not injurious to health, as the following list of those most commonly met with in the principal food products will show. This list has been compiled from the reports of the State Boards of Health, the returns of the British Inland Revenue Department, the reports of the British Local Government Board, and those of the Paris Municipal Laboratory.

FOOD PRODUCTS AND THEIR CHIEF ADULTERANTS.

Food Product.	Adulterants.
Milk, . . . . .	Water, removal of cream, addition of oleo-oil or lard to skimmed milk.
Butter, . . . . .	Water, salt, foreign fats, artificial coloring-matter.
Cheese, . . . . .	Lard, oleo-oil, cottonseed-oil.
Olive-oil, . . . . .	Cottonseed and other vegetable oils.
Beer, . . . . .	Artificial glucose, malt and hop substitutes, sodium bicarbonate, salt, antiseptics.
Syrup, . . . . .	Artificial glucose.
Honey, . . . . .	Artificial glucose, cane sugar.
Confectionery, . . . . .	Artificial glucose, starch, artificial essences, poisonous pigments, terra alba, gypsum.
Wines, liquors, . . . . .	Water, spirits, artificial coloring-matter, fictitious imitations, aromatic ethers, burnt sugar, antiseptics.
Vinegar, . . . . .	Water, other mineral or organic acid.
Flour, bread, . . . . .	Other meals, alum.
Bakers' chemicals, . . . . .	Starch, alum.
Spices, . . . . .	Flour, starches of various kinds, turmeric.
Cocoa and chocolate, . . . . .	Sugar, starch, flour.
Coffee, . . . . .	Chicory, peas, beans, rye, corn, wheat, coloring-matter.
Tea, . . . . .	Exhausted tea-leaves, foreign leaves, tannin, indigo, Prussian blue, turmeric, gypsum, soap-stone, sand.
Canned goods, . . . . .	Metallic poisons.
Pickles, . . . . .	Salts of copper.

The use of flours and starches of various kinds—wheat, corn, rye, peas, beans, etc.—as food adulterants cannot be considered injurious to health. However much the public may be cheated in the purchase of such adulterated articles of food, as ground spices,

coffee, etc., they are not poisoned by their consumption. It is a question how much a purchaser is himself to blame, in his endeavor to secure a "bargain," when he demands so great a quantity of any given material at less than it can be purchased at wholesale in the market, that he compels the unscrupulous manufacturer to make a compound which has never more and generally less than the proportion of the genuine material represented by the price asked.

Many articles of food spoil in transportation; and, under the plea of preventing further fermentation, resort is had to antiseptics, such as salicylic acid, sulphite of soda, borax, etc. These deserve mention as being additions to foods of a class of substances used to cloak carelessness in manufacture and otherwise, and producing in many cases deleterious effects on the human economy. In France and Germany the use of such antiseptics as salicylic acid in food products is prohibited, although in the latter country such addition is tolerated when the food product is exported to countries where such use is not prohibited.

#### ON THE THEORY OF ABSORPTION OF FAT.<sup>1</sup>

BY DR. MINKOWSKI.

The absorption of water even is subject to other laws than those of pure filtration and diffusion—"vital forces," meaning by the expression a sum of chemical and physical occurrences not yet thoroughly made out, come into play and complicate what was once considered a simple problem. With fat there are more complications, and, consequently, a host of theories. Amongst these, two stand out prominently. The one holds that the fat is first converted into a fine emulsion, of which the individual droplets are carried into the lacteals either by the activity of the cylindrical epithelium of the mucous membrane, or according to another view, by the agility of the leucocytes, who sally out between the cells, capture the globules of fat, and retire with them by the way they came into the lacteals. The second theory is that the neutral fat is split up in the bowel into glycerin and fatty acids. The fatty acids are then saponified by the alkalis, in the secretion of the intestine, and absorbed in the form of soluble easily diffusible soap. Once

<sup>1</sup> *Berliner klin. Woch.*, No. 15, 1890. Reprinted from *The Med. Chronicle*, June, 1890.

absorbed, it is reconverted into fat. The fact that fats are split up in the intestine, and that the organism can form fat out of fatty acids are points in favor of this theory. In this second theory, the porter-like activity of the cells, fixed or wandering, is dispensed with.

A third theory, the one held at present by most physiological chemists, maintains that the main part of the fat is absorbed as neutral fat in the form of an emulsion, but that to form this emulsion, part of the fat must have been previously broken up. An alkaline carbonate will not form an emulsion with neutral fat, but forms a soap at once with free fatty acids. Suppose a neutral fat intimately mingled with fatty acid and acted on by an alkaline carbonate; everywhere between the molecules of neutral fat will lie molecules of soap, and the result will be an exceedingly fine emulsion. All that is required is first a breaking up of the fat to a slight extent, so as to afford fatty acids which are saponified by the various alkaline secretions poured into the intestine. These are the secretions of the follicles of Lieberkühn (succus intestinalis) the bile, and pancreatic juice. The intestinal juice, according to most authors, excepting Schiff and Hoppe-Seyler, acts on the fat; and Bunge, from its richness in carbonate of soda, puts stress on its action in neutralizing the acids of the alimentary tract and emulsifying fat. The bile, beyond question, assists in the absorption of fat, but how it acts is not yet decided. In its absence the absorption is lessened but not stopped. What rôle does the pancreas play? The whole pith of the paper lies in the answer. The pancreas was completely removed in dogs by the author and Mering, and, with the exception of milk, all other fatty substances, *e. g.*, butter, olive oil, yolk of egg, fat of meat, even if given in the small quantities of 25 to 30 grains per day, were completely recovered from the fæces. When the food was mixed with fresh pancreas of pig, the greater portion of the fat was absorbed. It follows from this that, for the absorption of fats, the secretion of the pancreas is indispensable, and that no other can take its place. How does the pancreas act? Not by simply splitting up the fat, as fat broken up (*e. g.*, Lipanin with 6 per cent. fatty acid) was not absorbed; besides, fat was voided split up, although the pancreas was removed. Neither is the fat absorbed in the form of soap, since where the pancreas secretion enters the bowel the reaction is *acid*, and, what is even more to the point, soap



given in the food was completely voided as partly free and partly combined with alkalies. Of course, this last result also disposes of the theory of partial splitting up of the fat to permit of the rest being emulsionized by the alkaline secretion of the bowels.

Does then the pancreas act by stimulating the bowel's powers of absorption? No, for milk is absorbed after extirpation of the pancreas. It seems then the absorption depends on the shape in which the fat comes in contact with the mucous membrane of the intestine. In milk the form is that of a fine emulsion, differing (and this is an important point) from a soap emulsion in the extraordinary minuteness of the globules, and in its power of stability (*haltbarkeit*). It remains unaffected in an acid solution, whilst an alkali emulsion liberates its fat so that the globules run together to form large drops. A pancreas solution behaves like the milk.

Minkowski then has got thus far: "All fats, with the exception of milk, require to be acted on by the pancreas before they can be absorbed." The minute action, the method of absorption, still remains unsolved.

It is some months until the secretion of the pancreas becomes active in a child, and hence, it is supposed, milk is made absorbable without it.

A curious result of the experiments was, that when the pancreas was but partially extirpated, and the part left not in connection with the bowel, the absorption of fat was diminished, but it by no means ceased.

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### COD LIVER OIL.<sup>1</sup>

BY M. GAUTIER AND L. MOURGUES.

Richter, Schenck, De Jongh, Trousseau and Pidoux, Walsche, Oberghaus, Bouchardat, and a great number of other French, Dutch and German medical men consider the light-colored and brown cod liver oils to be the most efficacious. On the other hand, English doctors generally, and a number of medical men in other countries recommend by preference the white oils, on the ground that they are more acceptable to patients, especially to infants, who are the

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<sup>1</sup> Translated from an extract from a work by Messrs. Gautier and Mourgues, published in the *Journal de Pharmacie*, March 1, p. 253. Reprinted from *Phar. Jour. and Trans.*, June 14, p. 1018.

principal consumers, and that they are often better digested; further, the objection is sometimes raised that the brown oils may be the product from altered livers.

The authors describe the preparation of the oil in Newfoundland and Bergen. The fresh livers heated to about 60° C., either in a water-bath or in the presence of steam, yield an oil which, filtered through flannel, constitutes the white oil. If the livers are not treated immediately, they quickly undergo a commencement of fermentation, or rather of auto-digestion, which is not a putrid or ammoniacal fermentation under the influence of bacteria, for the mass does not become alkaline or rancid, but acquires an acidity that amounts to 0.4 to 0.8 gram of monohydrated sulphuric acid per kilogram. The envelopes of the hepatic cells are broken and partly liquefied and the minute drops of fat from the hepatic tissue saturate more and more the colored substances that exist in the liver. The ferments of the biliary parenchyma determine an action comparable to the lactic and butyric acidification of flesh after the cessation of life. The oil obtained under these conditions, after some hours' or days' standing of the livers, is pale colored or brown, and it owes its color and greater activity to the biliary matters that it holds in solution. It requires days, and even weeks, before the livers, left to themselves, undergo putrid fermentation in the cold countries where the industry is carried on.

The residue from this first treatment is subjected to boiling with water, but the oil so obtained is thick, dark and rancid, and has a fetid odor; it is employed for industrial purposes, not in pharmacy. It follows therefore that the pale colored and brown oils, properly manufactured, are not derived from livers tainted by putrid fermentation, and their great activity is explained by the fact that the fatty matter is charged with biliary principles to which reference will be made subsequently. This was the conclusion arrived at also by De Jongh.

It must not be lost sight of, however, that in special cases, the white oil may be preferable, not only because it is better tolerated, but also because it contains a larger proportion of phosphorus and extractive matters, to which the authors, like others, attribute a great part of the efficacy of cod liver oil in the reconstitution of the system.

In operating for the separation of the alkaloidal and other prin-

ciples from cod liver oil, the authors treated 100 kilograms of oil methodically with an equal volume of 35° alcohol, containing 3 grams of oxalic acid per litre. The oil was shaken with the alcohol in twenty glass bottles each of fifteen litres capacity, the free part of which was filled with carbonic acid to avoid the action of air upon the oil. After standing, the alcoholic liquid was siphoned off, exactly neutralized with milk of lime and evaporated *in vacuo* at a temperature not exceeding 40° C. Under these conditions the mixture remained limpid and nearly colorless. When it had been reduced to one hundredth of its original volume it was neutralized by precipitated calcium carbonate, filtered, and the desiccation finished *in vacuo*.

If it be desired simply to extract from this residue the total basic substances it contains, without regard as to the manner in which they are combined, the product of the evaporation is treated with 80° alcohol, and the extract is filtered or distilled until all the alcohol has passed over and concentrated *in vacuo*. In this way a syrupy extract is obtained to which caustic potash is added in fragments to liberate the bases. These are separated by shaking the mixture with ether, then precipitating the bases from the ethereal solution by means of an ethereal solution of oxalic acid, washing the precipitate with ether and drying. The scarcely colored dry oxalates obtained from 100 kilograms of oil weighed 52 grams.

In order to obtain the bases free, the salt is dissolved in the smallest quantity of water and the solution is treated with caustic potash. Under this treatment the alkaloids usually rise to the surface like a thick brown oil, which is due to the solution of two fixed bases in the oily bases.

The treatment with alcohol, acidulated with oxalic acid, removes from the oil nearly the whole of the bases. In the authors' experiments the quantity obtained varied between 0.380 gram and 0.485 gram per kilogram of the brown oils; but from the pale oils the yield was inappreciable, even when operating upon ten kilograms. If account be taken of the fact that a trace of basic substances remain in the oil after treatment with acidulated alcohol, it will be seen that the total bases contained in a kilogram of brown oil amounts to about half a gram. That would be about 6.5 milligrams of base, or 10 milligrams of the sulphates in each tablespoonful (13 grams) of oil, a quantity that, considering the powerful action of these bases, cannot be without effect on the economy.

Twenty-five grams of the mixture of oxalates dried over recently fused caustic potash yielded 12.5 grams of anhydrous bases. These were submitted to careful fractionation, first in air to a temperature of 120° C. and then *in vacuo*. Different alkaline liquids passed over in succession, and there remained a brown magma of bases that were solid or undistillable without decomposition. These were separated by converting them into hydrochlorides or platinochlorides.

After careful repetition of these operations the bases in cod liver oil were classified as follows :

(1) Fraction boiling at 87°–90°, under a pressure of 770 millimetres—*butylamine*. This portion constituted about one-sixth of the total bases.

(2) Fraction boiling from 90° to 100°, under the same pressure, with a fixed point 97° and 98°—*amylamine*. This fraction constituted one-third of the whole.

(3) A small fraction boiling above 100° and below 115°, consisting especially of *hexylamine*.

(4) Fraction boiling towards 100°, under a pressure of 6 centimetres of mercury, or at from 190° to 200° under ordinary pressure. This consists of a new base, *dihydrotoluidine*, and constituted about one-tenth of the total alkaloids.

(5) The fifth portion included the fixed bases. The basic residue that could not be distilled, being treated with dilute hydrochloric acid, dissolved almost completely. This solution, which was slightly colored, gave immediately with platinic chloride a flesh-colored precipitate, alterable in light, which was separated from the mother-liquor, and dried upon biscuit porcelain. From this platinochloride a hydrochloride was prepared from which a fixed base, named by the authors *aselline*, was obtained by precipitation with potash.

Upon concentrating the mother-liquor a second platinochloride, much more soluble than the first, was deposited of constant composition to the end. From this was obtained a sixth alkaloid that constituted about one-third of the total alkaloids of the oil. This substance, which is considered by the authors to be one of the most efficacious principles in cod liver oil, has been named *morrhaine*.

There remained in the potassic liquor, after the basic substances had been removed, the different fixed and volatile acids with which the bases were combined when dissolved out by the acidulated

alcohol. To this liquor, exhausted by ether, was now added a little sulphuric acid, and the following acids were obtained :

(1) A remarkable acid, which appears—especially when the liquor is heated a little—as a brown viscous mass, slightly soluble in water, having a disagreeable, slightly aromatic odor, recalling that of oils derived from marine algæ. It solidifies slowly in the cold and may be obtained crystalline after purification. The authors have named it *morrhucic acid*.

(2) Upon distilling the acidulated liquor, after the morrhucic acid had been separated, there passed over a mixture of *formic* and *butyric acids*.

(3) There still remained in the liquor (*a*) a small quantity of morrhucic acid in solution, removable by alcoholic ether when the solution had been evaporated ; (*b*) a certain proportion of phosphoric acid, derived from the phosphates, phosphoglycerates and lecithines of the oils ; (*c*) a little sulphuric acid having the same origin.

(4) These various acids having been separated, the residue was finally precipitated with subacetate of lead. After having filtered and removed the lead strong alcohol took up an extract having a nauseous odor. In the fractions of this extract boiling towards  $180^{\circ}$  *in vacuo*, the presence of glycerin was determined by converting it into acrolein. Glycerin, therefore, accompanies phosphoric acid in the complex substances removed by alcohol from cod liver oil, being partially combined with it, for after neutralization of the acid extract with lime phosphoric acid again makes its appearance in the liquor if it be boiled with a mineral acid. Phosphoric acid and glycerine are in fact contained in these oils in the form of lecithines.

The foregoing, with traces of coloring matters, are the alkaline and acid constituents separable from cod liver oil. Among them, only butyric, phosphoric and sulphuric acid had been noticed before. The special constituent which communicates to cod liver oil the characteristic property of giving a fine violet color when treated in the cold with strong sulphuric acid is not met with in the acidulated extract, alcoholic or aqueous.

Referring to the properties of these constituents, the authors state that butylamine, in sufficient dose, produces in animals fatigue, stupor, vomiting and a certain degree of paresia ; it excites the production of urine.

The amylamine from cod liver oil is a very active base. In a



small dose it excites the reflexes and promotes the urinary secretion. In a large dose it provokes convulsive trembling, then true convulsions and death.

Hexylamine has an action very similar to that of amylamine, but much less intense.

Dihydrotoluidine ( $C_7H_{11}N$ ) occurs as a colorless oil, having a brisk, not unpleasant odor, very alkaline and slightly soluble in water, upon which it floats. It attracts carbonic acid strongly from the air. Its hydrochloride is bitter, and crystallizes in very soluble confused needles or lamellæ. The nitrate reduces silver nitrate. The yellow platinochloride is readily precipitated, but is re-dissolved by heat. The aurochloride, soluble in the cold, forms long needles arranged like a fan. Dihydrotoluidine is a convulsivant toxic base.

Aselline occurs as a non-hygroscopic amorphous mass, with a density of 1.05. It turns yellow in air and light. When cold it is odorless; but it melts at about  $100^{\circ} C.$ , and the viscous liquid has a sweetish aromatic odor, recalling that of some ptomaines. Aselline is very slightly soluble in water, to which it communicates a faint bitterness and alkalinity. It is soluble in ether and especially in alcohol. The salts formed by it with acids are crystalline, but dissociate partially in water, especially when heated. In a sufficient dose aselline produces dyspnœa, stupor, convulsive disturbances, and with a still larger dose death.

Morrhuine ( $C_{19}H_{27}N_3$ ) is a very thick oily liquid, with an odor recalling that of lilac or acacia flowers. It is lighter than water, in which it is slightly soluble, and is very soluble in alcohol and in ether. It is very alkaline and caustic to the tongue and attracts a little carbonic acid from the air. The hydrochloride crystallizes in stars formed of acutely pointed needles, which are very deliquescent. The aurochloride forms a yellow precipitate. The platinochloride, which is rather soluble and alters rapidly in warm aqueous solution, crystallizes in microscopic barbed needles. The salts of morrhuine are not precipitated by mercuric chloride, but are by the double iodide of mercury and potassium. Morrhuine is a powerful stimulant of the functions of nutrition and assimilation; it produces a rapid circulation of the extractive residues of cell life towards the blood and the kidneys, where they are eliminated, provoking in this way indirectly a powerful movement of assimilation correlative of the losses consequent upon the inverse movement of de-assimilation.

This is considered to have been demonstrated by the super-excitation of appetite in animals brought under its influence.

As before stated a portion of the bases just described are combined in the oil under the form of lecithines. It is impossible, in fact, to concentrate an alcoholic extract made in presence of a mineral acid, although dilute, without the gradual deposition in the cold of a viscous acid to which the bases were originally joined; at the same time phosphoglyceric acid makes its appearance. The lecithines do not exist in the white or slightly colored oils; neither do the alkaloids, which is considered to be another proof that these bases occur under the form of complex phosphoglyceric compounds.

According to De Jongh, the brown oils contain per kilogram 0.789 gram of pre-existing phosphoric acid, removable by saponification, while the total phosphoric acid obtained by oxidation of the oil was 1.047 grams, but in the pale oil the quantities obtained were respectively 0.913 gram and 1.397 gram. It follows therefore from these figures that the phosphoric acid and phosphorus are not entirely derived from lecithines, for the oils yielding the most are those that do not contain phosphoglyceric compounds. Moreover, the organic phosphorus occurs in these oils in a form other than that of phosphoric acid capable of combining with alkalies; the phosphorus that becomes apparent only upon total oxidation of the oily substance is sensibly more abundant in the pale oils free from lecithines. Consequently, this phosphorus occurs in all the oils, pale or brown, in a form other than that of lecithines; and since it is not fully saturated with oxygen and constitutes part of a complex organic molecule, there can be no doubt that it is essentially assimilable and suitable to the reparation of tissue.

Morrhucic acid ( $C_9H_{13}NO_3$ ) is peculiar to cod liver oil, from which it is deposited slowly and gradually in the cold, more rapidly when the acidulated alcoholic extracts are concentrated by heat. It follows the bases in the various processes of extraction, and appears to be united with the principal of them in very instable combination. In order to separate simply the morrhucic acid it suffices to exhaust the oil with hydrochloric acid diluted with twenty times its volume of water, separate and filter the supernatant liquor, saturate with potassium carbonate and concentrate *in vacuo* at  $45^\circ$  to  $50^\circ$ . The acidulated residue is taken up by strong alcohol, and upon evaporating the alcohol and adding water, the acid is precipitated as a brown

resin that rises to the top of the water, in which it dissolves partially when heated. To purify this acid it is dissolved in dilute potash solution, the liquor neutralized with nitric acid and acetate of lead carefully added. The first brown precipitates that form are separated and rejected, and there is obtained afterwards a grayish-white plumbic precipitate, from which can be separated by treatment with sulphuretted hydrogen, a dirty yellow body that crystallizes in prisms or in square plates bristling with points. The formula attributed to this acid, as the result of analysis, differs from that of tyrosine ( $C_7H_{11}NO_3$ ) only in containing two atoms of hydrogen more.

Morrhuic acid is a weak acid, which reddens litmus, decomposes carbonates, is easily soluble in alkalies, with which it forms salts that precipitate the acetates of lead and nitrate of silver, but not acetate of copper. It is slightly soluble in hot water and separates from it partially on cooling in the form of an emulsion. The solutions have a slightly bitter disagreeable taste; their aromatic odor sometimes recalls that of cod liver oil and sometimes that of seaweed. Upon very slow evaporation of a dilute alcoholic solution the acid crystallizes in prisms having a square base, or in large plates, but a considerable proportion remains a long time in the form of oleaginous drops. Morrhuic acid belongs to the pyridic series of compounds, though it cannot be properly called a carbopyridic acid for it is not precipitated with heat by acetate of copper, but a pyridic acid having a constitution recalling that represented by phenyllactic acid ( $C_6H_5-CHOH-CO_2H$ ) or cinnamic acid in the benzene series. It behaves both as a moderately energetic acid and as a weak base.

The substance described by De Jongh under the name "gaduine" appears to correspond with morrhuic acid. This substance, which is perfectly harmless, possesses most powerful diuretic properties, quite similar to those the authors have recognized in morrhuine. Under the influence of morrhuic acid, the urine of guinea pigs, usually scanty and turbid, augments considerably in quantity and rapidly becomes clear, at the same time the animals attack food with avidity. These characters show, in the authors' opinion, that morrhuic acid, like morrhuine, excites the assimilatory functions and the appetite. The bases properly so-called exist in cod liver oil in small quantity, but morrhuic acid occurs in it to the extent of upwards of a gram per litre. It would appear therefore to be one of the most important agents in the efficacy of the oil.

But the authors do not consider that the undeniable reparative action of the oil is entirely due to the alkaloids and morrhuic acid, since this is attributable to three groups of special agents. In the first place the oil acts by its fatty bodies, which are eminently assimilable in consequence of their slight acidity and partial saponification, the latter being due to the influence of hepatic ferments and the solution in the oil of a certain quantity of biliary matters that render emulsification easy, especially under the influence of the pancreatic juice. These fatty bodies are energetic reconstituents of the tissues through their richness in phosphates, phosphoglyceric acid, lecithines and organically combined phosphorus, the phosphorus being presented to the system under the form in which it exists in milk, eggs, the brain, legumin, nuclein, etc. Secondly, bromine and iodine, which are present in the oil in minute quantities (0.030 gram to 0.040 gram of iodine per litre), contribute doubtless also to the reparative action. Lastly, cod liver oil acts by the morrhuic acid it contains, as well as by its bases, several of which, butylamine, amylamine and especially morrhaine, excite the nervous system, accelerate denutrition, as indicated in the considerable increase of urine and sweat excreted, and correlatively augment the appetite.

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### AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-eighth annual meeting of the American Pharmaceutical Association will be held at Old Point Comfort, Virginia, first session, Monday, September 8, at 3 P.M.

Although I have no official notice on the subject, I understand that the Virginia Pharmaceutical Association have postponed their meeting to the same date, with the intention of holding it simultaneously with that of the A. P. A. and at the same place.

In view of our convention being held in such a delightful location and one so easily accessible from all parts of the country, it is hoped and expected that we will have one of the largest meetings held for years.

Full information regarding hotel and railroad rates will be furnished our members later on, in the usual annual circulars.

All matters concerning exhibits, etc., will be taken in charge by the local Secretary, Mr. Charles E. Dohme. Any communications, in regard to same, sent to his address, cor. Pratt and Howard Streets, Baltimore, Md., will receive prompt attention.

All papers to be read at the next meeting should be forwarded at as early a date as possible to Prof. H. M. Whelpley, No. 113 Market Street, St. Louis, Secretary of Committee on Scientific Papers.



Owing to the lamented death of our much esteemed President, Prof. Emlen Painter, it devolves on the undersigned to issue this call.

KARL SIMMON,  
*Acting President.*

ST. PAUL, MINN., June 18, 1890.

## PHARMACEUTICAL ASSOCIATIONS.

*The Alabama Pharmaceutical Association* met in Tuscaloosa, May 13. Besides the usual routine business, the most important action taken was in regard to the exemption of druggists from jury duty, the Committee on Legislation being instructed to prepare a bill for consideration by the Legislature. The reading of a paper by Dr. Humphries on the cutting of prices in the sale of proprietary articles elicited the accustomed animated discussion, but though the practice of cutting was denounced as unprofessional, a practical remedy does not appear to have been proposed. The Secretary, Mr. P. C. Candidus, was the recipient of a gold-headed silk umbrella presented to him in recognition of his valuable services.

The executive officers for the current year are: W. F. Punch, Mobile, President; E. P. Galt, Selma, Treasurer, and P. C. Candidus, Mobile, Secretary. The next meeting will be held at Huntsville, on the second Tuesday in May, 1891. J. L. Risin was elected local Secretary.

*The Kansas Pharmaceutical Association* held its eleventh annual meeting in Music Hall, Topeka, May 20-22, President Allen in the Chair. An address of welcome was delivered by Governor Humphrey, who encouraged the association in the endeavor to benefit the public through the advancement of pharmacy, and suggested that the Legislature would give all reasonable aid. The President's address was very brief; the Secretary and Treasurer presented their reports, as did also the various committees. Amongst the papers read were the following: On the advisability of recognizing by the Pharmacopœia patented chemicals, like antipyrine, etc., by M. L. Stone; on the preparation of Dover's powder, by J. T. Mooré; on abstracts and trituration, by M. Noll; on commercial chocolates, by G. F. Wida; on adulterations, by Prof. L. E. Sayre, etc. The question of periodical registration was discussed, since the fee from registration was found to be insufficient to enable the State Pharmacy Board to fully carry out the law; the subject was referred to the Executive Committee with full power.

The election of officers resulted in the choice of C. D. Barnes, Abilene, for President; J. T. Moore, Lawrence, Secretary, and H. W. Spangler, Treasurer. The former Treasurer, Mr. Mehl, having declined re-election.

The invitation extended by C. L. Becker was accepted, and Ottawa was selected as the place for holding the next meeting in May, 1891.

*The Missouri State Pharmaceutical Association* assembled at its twelfth annual meeting at Excelsior Springs, June 3-5. The President's annual address was made by C. E. Corcoran, and reports were read from the Secretary, Treasurer, several delegations, and various committees. A report made by Mr. Alexander, member of the State Pharmacy Board, resigned, showed that 470 physicians had registered under the amended law without examination; quite a



lively discussion was caused by this announcement. The subject of pharmacopoeial revision received much attention, and efforts will be made to present the views of the Missouri pharmacists to the Committee on Revision recently appointed at Washington. Pertaining to the same subject is the metric system of weights and measures, which was discoursed by Professors Curtman, Whelpley and Good, many members participating approvingly in the discussion, which followed these addresses.

An interesting affair was the exhibition of about 200 preparations made in accordance with the National Formulary by students of the St. Louis College of Pharmacy under the supervision of Prof. Hemm. For several years past, Mr. R. J. Brown and others have interested themselves in Inter-State Pharmaceutical Meetings, and the time seems to be near when such a meeting will be held as a "Conference of the Western Inter-State Associated Pharmacists," the initial meeting to be constituted of ten delegates each from the states of Arkansas, Illinois, Indiana, Iowa, Kansas, Missouri and Nebraska.

The executive officers for the current year are: W. E. Bard, Sedalia, President; G. H. C. Klie, St. Louis, Secretary, and G. J. Meyer, Treasurer. The Association will meet again at Excelsior Springs, on the second Tuesday of June, 1891; M. Cravens is local Secretary.

*The Nebraska State Pharmaceutical Association* convened at its ninth annual meeting in Washington Hall, Omaha, May 13, President Goodman in the chair. The Association was welcomed to the city by Mayor Cushing. The President's address referred to the desirability of having more papers read at the annual meetings; to the inroads made by patent medicines; to shorter business hours and closing on Sundays; to the selling of liquors by apothecaries, etc. Reports were read from the State Board of Pharmacy, from the Secretary, the Treasurer and the various committees and delegations to other societies. In view of the fact that prohibitory laws had resulted in transferring the traffic in liquors to the drug stores, thus degrading the aims of pharmacy, the association declared itself as being not in sympathy with the proposed prohibition amendment to the Constitution of Nebraska. The recommendation of the Committee on Legislation, that no amendments to the pharmacy law were desirable at present, and that the inauguration of the School of Pharmacy be deferred for further consideration, met with the approval of the meeting. Mr. C. J. Daubach, Lincoln, was elected President; J. Forsyth, Omaha, Treasurer, and Mrs. Julia M. Crissey, Omaha, Secretary. The next annual meeting will be held in Beatrice, May 26, 1891, the local Secretary being J. D. Rainey.

*The Tennessee State Druggists' Association* met at its fifth annual meeting in Nashville, May 21. The proceedings commenced with an address by Professor Dudley, of Vanderbilt University, the annual address by President Dowdy, and the reports of officers and committees. The report on trade interests was followed by a discussion resulting in the appointment of a committee charged with the drafting of an address in relation to the prescribing by physicians of proprietary and secret preparations. After the adoption of this address, the committee presented the same to the American Medical Association, then in session in Nashville. The draft of a pharmacy law for the state was presented by a committee, and after discussion referred to a committee to present the same to the Legislature.

The officers for the current year are : A. A. Yeager, Knoxville, President; J. L. Thompson, Nashville, Secretary, and E. L. Laurent, Nashville, Treasurer. At the next meeting, which will be held at Knoxville on the third Wednesday of May, 1891, a competitive exhibition will take place of preparations made by pharmacists of Tennessee.

The *Texas State Pharmaceutical Association* held its meeting in San Antonio, May 13. An address by Mayor Walthall, President Williams' address, and the usual routine business occupied the first day's session. On the two following days, the reports of officers and committees were read and discussed; several papers were read; the sum of \$200 was voted to be annually awarded for four prizes for papers presented at the meetings; Houston was selected for holding the next annual meeting, on the second Tuesday of May, 1891, and the following executive officers were elected: President, W. B. Morrison, Waco; Secretary, L. Myers Connor, Dallas; Treasurer, E. W. Lancaster, Marshall, and J. Burgheim, local Secretary.

The *Pennsylvania Pharmaceutical Association* convened at its thirteenth annual meeting at York, June 10, President J. W. Miller, of Allegheny, in the Chair. Second Vice-President Patton having been absent from the meeting, held last year, was introduced to the Association. Mr. H. A. Hay, the Chairman of the local committee, introduced Mayor D. K. Noell, who in welcoming the members to the city of York, related some reminiscences of his brief career as a druggist's apprentice nearly sixty years ago. Treasurer Lemberger replied to the address of welcome in appropriate terms. A Committee on Reception and Introduction, consisting of the local Secretary, Second Vice-President and three other members was appointed.

The President then delivered his annual address, in which the work done during the past year was reviewed, and a number of suggestions were made with the view of increasing the usefulness of the Association, the latter being referred to a committee consisting of Messrs. McGarrah, of Scranton; Prichard, of Tyrone, and George, of Harrisburg.

A resolution was adopted extending the courtesies of the floor to the physicians of York and vicinity, and a committee was appointed to receive and report on credentials of delegations appointed to this meeting.

Reports were received, and disposed of, from the Executive Committee, the Secretary and the Treasurer, the latter reporting the receipts during the year to have been \$1,462.27, the total expenses, \$685.14, and the balance on hand, \$777.13.

After the appointment of a Committee on the Time and Place of the next annual meeting, an adjournment was had until 8 o'clock P.M.

At the second session the following officers were elected: J. H. Stein, Reading, President; J. F. Patton, York, and W. H. McGarrah, Scranton, Vice-Presidents; J. L. Lemberger, Lebanon, Treasurer; J. A. Miller, Harrisburg, Secretary, and J. H. Redsecker, Lebanon; C. T. George, Harrisburg, and W. Harris, Hamburg, Executive Committee.

Reports were received from the Committees on Legislation, on the Revision of the Pharmacopœia, on Credentials, and others. A touching reminiscence was that of Mr. J. W. Colcord, who was present as a delegate from Massachusetts, and who, in 1863, after the battle of Gettysburg, lay wounded in the lecture hall of the Odd Fellows' Building, where the present meeting was held, and which at that time had been converted into a hospital.

The Secretary was instructed to send cordial greetings by telegraph to the State Medical Association, then in session in Pittsburgh, and to the Ohio Pharmaceutical Association, in session in Toledo.

Three sessions were held on Wednesday, June 11, during which the remaining special committees presented their reports. Bedford Springs was selected as the place for holding the next meeting, either on the second or third Tuesday of June, 1891, the day to be fixed by the Executive Committee, so as not to conflict with the time of meeting of the State Medical Association.

The recommendations contained in the President's address came up for consideration on the report of the special committee, and it was decided that the code of ethics be not changed; that the Committee on Legislation and Trade Interests be hereafter replaced by two committees, one on legislation and one on commercial interests, the latter to consist of seven members and to have charge of all matters relating to the commercial part of pharmacy; the legislative committee was requested to endeavor to effect the repeal of special laws still in force in some sections of the state and rendering some of the provisions of the pharmacy law unequal in application in different parts of the state; the Chairman of the Committee on Queries was requested to make special efforts to interest the younger members of the association in the investigation of pharmaceutical subjects and the preparation of papers for the annual meetings; it was also decided that during the reading of papers ordinary business be suspended.

Amendments to Chapter II of the By-laws were adopted, requiring the Treasurer to render a statement of account to members two years in arrears with their annual dues, preceding their suspension; also, that the charge for certificate of membership hereafter be \$1 instead of \$3.

A letter from Mr. Hallberg was read, giving information of the formation, by the American Medical Association, of a section on materia medica and pharmacy; the appointment of a committee of three was directed, with the view of participating in the labors of that section, if admissible.

Mr. J. Crawford, of Philadelphia, had sent an herbarium of mostly medicinal plants collected by him in the eastern section of Pennsylvania. This was exhibited to the meeting by Prof. Maisch, who also showed, on behalf of Mr. Kilmer, of New Jersey, specimens of a locoweed coming from Arizona, and stated that this specimen was not identical with *Astragalus mollissimus*, the most widely diffused locoweed of the West; that it was a leguminous plant and apparently belonged to the genus *oxytropis*. However, a closer examination subsequently made, showed the plant to be most likely an *astragalus*, section *phaca*, the species being not determinable without the fruit.

The report by Prof. Trimble on *adulterations and deteriorations* created considerable discussion, resulting in the passing of a resolution offered by Dr. Lowe, that \$250 be appropriated for the purpose of preparing legal evidence in cases of adulteration.

Two of the papers read during the sessions appear in full in the present issue, entitled "The Botanical Origin of some Pharmacopœial Drugs" and "Notes on some North American Medicinal Plants."

A query relating to the preservation of *concentrated infusions* was answered verbally by Mr. Lemberger, who had found 12 per cent. of alcohol to be sufficient for several concentrated infusions, which are to be diluted with water

when dispensed. A question as to the use of *compound infusion of gentian* elicited the information that its use is rather local, apparently confined to the section of Pennsylvania east of the Alleghenies, and that in some localities, particularly in the western section of the state, it is very rarely prescribed.

*The use of cottonseed oil* for preparing *cold cream* was the subject of a paper by W. L. Cliffe. The following formula is given in parts by weight and in approximately definite weights: Cotton seed oil, 500 parts (15 oz.); spermaceti, 120 parts ( $3\frac{1}{2}$  oz.); white wax, 120 parts ( $3\frac{1}{2}$  oz.); oil of lavender flowers, 1 part (12 drops); rose water, 259 parts (7 oz.). Cotton seed oil being somewhat of a drying nature, it was questioned whether it was as well adapted for cold cream as the non-drying almond oil. Attention was called to the fact that the expressed oils of peach and apricot kernels are sometimes sold as almond oil, and that they are closely analogous to the latter, but may be distinguished from it by producing a reddish color on being warmed with diluted nitric acid.

*Cascara Cordial.* The following formula was furnished by Mr. J. H. Redsecker: Prepare an elixir from aromatic spirit (Nat. Formulary) 4 fl. oz.; syrup, 8 fl. oz.; orange flower water, and water, of each 2 fl. oz. Mix, filter through talcum, and to 12 fl. oz. of the filtrate add 4 fl. oz. of tasteless fluid extract of cascara sagrada (prepared with the aid of magnesia). The preparation is a pleasant and efficient laxative. The question being asked whether the extract made with magnesia would not lose its purgative properties, a conclusive answer could apparently not be given.

*Comparative test of pepsins* was the title of a paper read by Mr. W. L. Turner. The author procured six brands of pepsin and digested 15 milligrams of each for seven hours at a temperature of 105° F. With 80 gm. of hard-boiled albumen previously passed through a No. 30 wire sieve, with 100 cc. of a 1 per cent. diluted hydrochloric acid. After setting aside for ten hours the liquid was filtered from the undissolved albumen and the amount of dissolved peptone was obtained by evaporation and drying. It was ascertained that 100 parts of dried albumen would yield 214 parts of dried peptone, and upon this basis was calculated the proportion of albumen dissolved, and the real value of each brand as compared with the price of the one having yielded the best results, which was Lehn and Fink's scale pepsin (No. 2 of the following table):

No.	Digested	1833	Parts	Albumen.	Cost	\$1.25	Pr. oz.	Value	\$0.96
" 2	"	1930	"	"	"	1.00	" "	"	1.00
" 3	"	1793	"	"	"	.75	" "	"	.93
" 4	"	1485	"	"	"	1.25	" "	"	.70
" 5	"	1071	"	"	"	1.40	" "	"	.61
" 6	"	966	"	"	"	.50	" "	"	.53

*Syrup of Citric Acid*, U. S. P., changing in odor and taste when kept on hand, Mr. J. W. Landis recommended it to be prepared extemporaneously, by mixing simple syrup with the requisite amount of concentrated solution of citric acid and of spirit of lemon; the citric acid solution is to be kept in small vials in a cool place. This method is frequently followed, particularly for lemon syrup used for soda water.

*The Production of Oil of Pennyroyal* was discussed in a paper by Mr. J. F. Patton. The oil is distilled in Virginia, North Carolina, Missouri, Illinois and more extensively in Southern and Eastern Ohio. Guernsey Co., O., has



produced in one season 3,000 lbs., but last year the product was less than 100 lbs. During the discussion it was stated that variable quantities of the oil were also distilled in Pennsylvania and New Jersey. In a letter read it was stated that the plant could not be cultivated from the seed. This was explained as probably referring to the possible difficulty of raising the plant from seed in rich soil, since it was confined to sandy localities and poor soil. It was, however, stated that westward it grows in all kinds of soil, though in damp and rich ground it is, perhaps, less strongly odorous than in drier and more sandy situations. The fresh herb was stated to yield from 20 to 25 pounds of oil to the ton.

The proportion of proprietary preparations and ready-packed articles purchased by pharmacists was the theme of an interesting and suggestive paper read by Mr. M. N. Kline. The purchases, for a period of three months, of five pharmacists in five large cities of Pennsylvania east of the Allegheny Mountains and outside of Philadelphia, were found to be as follows:

1. Total \$1,021.85, including pat. and propr. art.	\$641.87	or 64 %	packeted \$6.00	or 6-10 %
2. " 556.57 " " "	301.17	" 56 %	" 6.10	" 1 %
3. " 887.25 " " "	598.25	" 66 %	" 7.69	" 1 %
4. " 516.81 " " "	374.16	" 73 %	" 0.35	
5. / " 816.30 " " "	645.05	" 80 %	" 5.90	" 3-4 %
\$3,798.78	\$2,560.50	67 %	\$26.04	2-3 %

Arranged in a like manner, 1,125 consecutive wholesale orders gave total \$33,538.94, with \$19,873.74 or 59 per cent. pat. and propr. art., and \$285.27 or 8-10 per cent. packeted goods.

Another 100 consecutive orders represented a total value of \$3,192.35, of which sum \$1,730.10 or 54 per cent. for patent and proprietary articles including \$132.36 or 4 per cent. pharmaceutical proprietary articles sold under the name of the makers, and protected synthetical preparations. There were in addition \$183.30, or 6 per cent. various galenical preparations, and \$23.11, or 7-10 per cent. packeted goods, like pressed herbs, etc.

In the entire number of these orders two only were found which contained no proprietaries and no packeted articles.

Several other papers were read, of which abstracts cannot well be given. One relating to the enforcement of the Pharmacy Act caused an animated discussion, eliciting the fact that nearly all complaints of violations that had been lodged with the Pharmaceutical Examining Board were either not accompanied by the requisite proof or could not be substantiated.

After the adjournment of the fourth session on Wednesday afternoon, the visitors were invited to a drive through the principal streets of the city and to the residence of Mr. George Small, from where a magnificent view was had of the city, the country surrounding York and the valley watered by Codorus Creek. The fifth session was then prolonged until near midnight, and when the business before the meeting was finished, and hearty votes of thanks for all the courtesies received had been passed, the Association adjourned finally, and on Thursday morning the visitors, local members and other excursionists took a special train for Gettysburg, where, under the guidance of Captain Long, the famous battle field was visited, with its numerous monuments which now mark the different spots that witnessed the memorable struggles in July, 1863.



## EDITORIALS.

*The German Pharmacopœia.*—We learn from the "Pharmaceutische Zeitung" of June 18, that the Federal Council of Germany has ordered the new "Arzneibuch" to be printed, and to become obligatory from January 1, 1891. It will be issued in the German language with only the titles of the medicaments in Latin.

Early in 1887 a commission was appointed by the Chancellor, charged with collecting, arranging and critically examining the material for the new work. The preliminary labors were so far completed by the middle of 1888 that the material could be handed over to the special committees of apothecaries, chemists and pharmacognosists. Not less than 1240 new articles had been recommended for adoption; however, only a small number was finally selected. The labors of the special committees were considered by the sub-committees at meetings held June 12 to 19, 1889, when it was found that the changes considered necessary were so numerous that, instead of issuing an appendix to the second edition, the elaboration of a new third edition of the Pharmacopœia was deemed advisable, and received the sanction of the imperial health office. The final deliberations took place October 11 to 19, 1889, when the general commission met, in conjunction with health officers, military commissioners and veterinary surgeons detailed for this service. By resolution of the Federal Council of November 21, 1889, the text of the Pharmacopœia was ordered to be drawn up in the German language, as stated above.

Of the fifty new articles the following are not contained in the present U. S. Pharmacopœia: Acetanilidum, Acidum trichloraceticum, Æther bromatus, Agaricinum, Albumen Ovi siccum, Amylenum hydratum, Antipyrinum, Capsulæ, Chininum tannicum, Chloralum formamidatum, Codeinum phosphoricum, Cuprum aluminatum, Emplastrum Cantharidum pro usu veterinario, Extractum Condurango fluidum, Homatropinum hydrobromicum, Hyoscinum hydrobromicum, Keratinum, Liquor Ferri albuminati, Mentholum, Naphthalinum, Naphtholum, Paraldehydum, Phenacetinum, Physostigminum sulfuricum, Resorcinum, Rotulæ Sacchari, Salolum, Sebum salicylatum, Semen Arecæ, Semen Strophanthi, Species diureticæ, Sulfonalum, Terpinum hydratum, Thallinum sulfuricum, Tinctura Strophanthi, Unguentum Acidi borici, and Vinum Condurango.

In addition to these the following general articles have been admitted: Electuariæ, Emplastra, Extracta fluida, Granula, Linimenta, Pastilli, Pilulæ, Styli caustici, Suppositoria and Tabulæ.

Fifty-eight articles have been dismissed, among them morphine sulphate, other morphine salts being employed in preference. Various changes have been made in nomenclature, and "Sirupus" is now the adopted spelling for syrups. The reagents, including the volumetric solutions, have been increased from 67 to 89. As might be expected, a number of changes have been made in the preparations retained from the preceding edition. The table of solubilities is discontinued. The tables of maximal doses and of specific gravity have been revised, and the list of synonyms has been considerably augmented.

*Precautions against disease.*—We are in receipt of a series of the precautionary circulars issued by the State Board of Health of Pennsylvania, and cheer-

fully comply with the request of stating that the Secretary, Dr. Benjamin Lee, Philadelphia, will forward them to any applicant on the receipt of a two-cent postage stamp. The circulars are enclosed in a substantial envelope, in which they can be preserved for reference in case of emergency. The circulars received relate to the care of infants, to school hygiene and to precautions against typhoid fever, scarlet fever, consumption and against contagious and infectious diseases in general.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

### *Bulletins of the U. S. Department of Agriculture.* 1890.

We acknowledge the receipt of Bulletin No. 26, Division of Chemistry, containing a record of experiments in the production of sugar from sorghum, in 1889, in Iowa, New Jersey, Virginia, Louisiana, Maryland and Kansas. The author of the report is the chief chemist, H. W. Wiley.

Also, from the Division of Botany, the first number of the Contributions from the U. S. National Herbarium, containing lists of plants collected by Dr. Edward Palmer in different parts of Southern California, and the country adjacent thereto. The names of the species are usually accompanied by critical remarks. We learn that the National Herbarium has assumed such large proportions and is being so rapidly augmented by the botanical investigations which are being prosecuted, that it becomes important to have a medium through which the results of the investigations may be brought to the notice of botanists. These contributions are edited by Dr. George Vasey, the Chief of the Division of Botany.

### *Experimental Farms.* Reports for 1889. Ottawa: 1890. pp. 152.

An annual report made to the Minister of Agriculture by the Director, Prof. Wm. Saunders, and accompanied by the reports of various officers of the different Canadian experimental farms.

### *Seventh Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass., 1889.* Boston: 1890. pp. 333.

An annual report made by Dr. C. A. Goessmann to the Board of Control, and including the reports of the physiologist and of the various assistants.

### *Report of the Department of Health of the City of Chicago for the Year 1889.* 8vo. pp. 140.

In addition to the matter usually found in such reports, the one before us contains, also, considerable statistical information, notably on labor and industry. The following will be of special interest to our readers: In 1889, there were in Chicago 71 firms engaged as wholesale druggists or manufacturers, employing 850 persons, of whom 175 were females. The number of firms engaged as retail druggists was 475, with 1,075 employes, of whom 25 were females. There were 1,650 medical firms, and with these 1,700 males and 50 females were connected. In addition, there were 90 veterinary surgeons.

*Strophantus Hispidus*, its natural history, chemistry and pharmacology. Part I. Natural history and chemistry. By Thomas R. Fraser, M.D., etc., Professor of materia medica in the University of Edinburgh. pp. 75.

This essay is a most valuable contribution to the history of *strophanthus* as

a medicine. It is now twenty years since Professor Fraser published his first observations on the physiological action and the chemical constituents of the drug in question. Previous to that time the kombé was known as an African arrow poison, chiefly through the writings of missionaries and travellers in the Dark Continent. The substance of this information is contained in the essay before us, together with the results of recent investigations, notably the long-continued researches made by the author, or which were incited through the interesting facts ascertained by him. Accordingly, we find here, aside from the general historical introduction, a full account of the use of kombé as an arrow poison, a description of the arrows used by the different tribes with the poison, an excellent botanical description of the genus and of the particular species, including the morphology and histology of the different organs, and the chemical history of the principles present in the seeds, as well as in other parts of the plant. Besides in the seed, strophanthin is also contained, though in much smaller quantity than in the former, in the comose appendage, the placenta, endocarp, pericarp, leaves and root, but not in the bark of either the branches or stem. The subject is handsomely illustrated by seven lithographic plates, showing the different kinds of arrows, the different parts of the plant in their natural appearance and their structure, and the crystals of strophanthin and strophanthidin, obtained under various conditions.

*A manual of pharmaceutical testing* for the man of business and his assistants, comprising simple instructions for the testing of the chemicals of the British Pharmacopœia, etc., with such materials and appliances as are in common use at the dispensing counter. By Bernard S. Proctor, F.I.C. Published at the offices of the *Chemist and Druggist*, London, and at Melbourne and Sydney. 1890. 12mo. pp. 176.

In our opinion, there will be scarcely any pharmacist who would not endorse the author's position on the important question of testing as expressed in the prefatory and introductory remarks to the little work now before us. "Every pharmacist," the author says, "should test his chemicals occasionally, to see that their quality is up to the required standard. To do this frequently, the tests must be the simplest, speediest and most inexpensive that may be devised. The tests should answer the question, Is the article fit for use? And having given an answer to this, it is in many cases of little moment whether or not the extent of deviation from standard be indicated. It is usually better and simpler to reject that which is faulty than to make an exact analysis and allow for its deficiencies. Absolute purity is a thing only theoretically attainable, and it is better to define within clear and reasonable limits what may be allowed in practice than to give definitions which, from being unnecessarily and impracticably stringent, become a dead letter. \* \* \* It is assumed that the degree of accuracy which ought to be demanded in pharmaceutical testing is the same—neither more nor less than that accuracy which is demanded of the pharmacist in the performance of his dispensing and operative processes, and, in this view, good qualities of the usual pharmaceutical measures, weights and balances, if carefully used, give results of a satisfactory degree of accuracy for the practical valuation of remedial activity."

From the practical standpoint thus indicated the work is written. The preliminary chapter contains much useful information on processes and manipula-

tions which will be particularly appreciated by the student. The various articles are considered in alphabetical order; they include not only chemicals, but also certain galenicals and crude drugs, like hydrargyrum cum creta, unguentum hydrargyri, acacia, cetaceum, colocynthis, copaiba, guaiaci lignum, oleum olivæ, scammonium and others. The tests of the British Pharmacopœia are primarily considered, their critical value being briefly indicated, and such modifications or additional tests suggested as the author's rich experience deemed necessary. A distinction is made between such impurities which result from faulty manufacture and intentional adulterations. As a rule, the tests of the B. P. are stated to be sufficiently simple and satisfactory, but in many cases simpler methods of attaining the required indications are described. Examinations by means of the microscope are not included in the present work.

From the preceding remarks the value of the work becomes obvious, it is one which may be consulted on all occasions falling within its scope, when to all practical questions it will give practical answers devoid of theoretical considerations, but reliable in all the details. The useful work is presented by the publishers in an attractive and serviceable garb.

*Universal Pharmakopœe.*—Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nord Amerika gültigen Pharmakopœen von Dr. Bruno Hirsch. Göttingen: Vandenhoeck & Ruprecht. 1890.

*Universal Pharmacopœia.*—A comprehensive comparison of the pharmacopœias at present in force in Europe and in North America.

In our last volume we have noticed somewhat in detail the merits of this valuable work, which is now complete with the appearance of copious index and the tables condensed from those appended to the various Pharmacopœias. Of the latter, one of the most instructive ones is that giving the maximal doses permitted by the different works, showing how uncertain a quantity a so-called maximal dose is in the opinion of different medical authorities, as will be seen from the following examples in which the lowest and highest maximal single doses are stated: carbolic acid, 0.045 and 0.10 gm.; aconitine, 0.001 and 0.005 gm.; atropine sulphate, 0.001 and 0.002 gm.; chloral hydrate, 2.0 and 5.6 gm.; alcoholic extract of nux vomica, 0.02 and 0.15 gm.; digitalis, 0.1 and 0.3 gm.; iodine, 0.01 and 0.05 gm.; morphine, 0.02 and 0.03 gm.; strychnine, 0.005 and 0.015 gm.; veratrine, 0.005 and 0.01 gm., etc. A reference to the U. S. P., on page 1104, may easily be erroneously construed; it is stated there that the British and U. S. Pharmacopœias divide the pound into 16 instead of into 12 ounces, and for the latter the metric value is given for 1 pound = 16 ounces troy. The apothecaries' weight recognized in this country has the same subdivisions as the Nuremberg medical weight, the ounce (troy) being equal to 31.103 gm., while the mercantile or avoirdupois pound is divided into 16 ounces of 28.350 gm.

Referring to our former notices of this meritorious work, we need to add merely that it has been carried to its completion in the exact and comprehensive manner in which it was begun, and that it deserves a prominent place among the works of reference relating to pharmacopœial matters and to medicines in general.



## VARIETIES.

**SOZOIODOL IN RHINOLOGY AND LARYNGOLOGY.**—In a thesis on this subject, Dr. Stern gives the therapeutical indications for this new product. He is inclined to believe that its action depends upon the grouping of the component atoms. Sozoiodol possesses the advantage over iodol and iodine of being disengaged in the organism in its organic composition and not in the form of an iodurite. Furthermore, the action of the sozoiodols may be varied in their action by combining them with various metals. The following are the indications given by Stern for the employment of the various preparations of sozoiodol in diseases of the nose and larynx:

(1) *Sozoiodol of sodium*, readily soluble. Indicated in all cases where it is desired to obtain a general antiseptis rather than a local antiseptic action. It is also used in all cases where aqueous solutions are employed.

(2) *Sozoiodol of potassium*, sparingly soluble. It diminishes the secretions and acts as a desiccant—it is therefore indicated in eczema. It is usually employed with talc in the proportion 1-5 or 1-6.

(3) *Sozoiodol of zinc* acts locally as an irritant in solutions of from 1-20 to 1-50, and as a caustic in a solution of 1-5.

(4) *Sozoiodol of mercury* acts locally as a caustic, even in a solution of 1-10. Miller affirms that a solution of  $2\frac{1}{2}$  parts in 100 of this solution kills the acarus in 24 minutes.

Good results have been obtained in atrophic nasal catarrh (sozoiodol of zinc 1 part, talc 10 parts), in hypertrophic rhinitis and rhinopharyngitis (sozoiodol of zinc 1 part, talc 12 parts); good effects have also been obtained in tubercular ulceration of the pharynx and larynx, and in syphilis of the nose and larynx (zinc salt 1-12, or mercuric salt 1-20). The sozoiodol should be used in the form of powder, unguent, etc. Where use is made of aqueous solutions the sodium salt should be used.—*L'Union Méd.; Jour. Amer. Med. Assoc.*, May 24, 1890. See also AMER. JOUR. PHARMACY, 1888, p. 621, and 1889, p. 17.

**The Antiseptic Power of Coffee.**—Dr. Lüderitz has recently made a number of observations on the destructive power of coffee upon various microbes. He found that the organisms all died in a longer or shorter period—*e. g.*, in one series of experiments anthrax bacilli were destroyed in three hours, anthrax spores in four weeks, cholera bacilli in four hours, and the streptococcus of erysipelas in one day. It was, however, remarkable that good coffee and bad coffee produced precisely similar effects. He believes that, as previous observers have suggested, the antiseptic effect of coffee does not depend on the caffeine it contains, but on the empyreumatic oils developed by roasting.—*Jour. Am. Med. Assoc.*, May 10.

**Iodoform emulsion** has been much employed as a local antiseptic and an antituberculous remedy by Prof. Billroth and others. For preparing the emulsion, finely-powdered iodoform is suspended either in a mixture of almond and castor oils, or in olive oil and glycerin, or in glycerin alone. Moorhof's formula directs iodoform 50, glycerin 40, distilled water 10, and tragacanth 0.30. Billroth found a 10 per cent. emulsion serviceable, and Jasinski injected 180 gm. of a 10 per cent. emulsion at once without observing any toxic symptoms.—*Jour. Amer. Med. Assoc.*, June 10, pp. 873, 874.